FEDERAL PROCESSING SERVICES

SYSTEMS OPERATIONS MARKET,

1989 - 1994

INPUT

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INPUT OFFICES

North America

San Francisco
1280 Villa Street
Mountain View, CA 94041-1194
Tel. (415) 961-3300   Fax (415) 961-3966

New York
Atrium at Glenpointe
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
Tel. (201) 801-0050   Fax (201) 801-0441

Washington, D.C.
INPUT, INC.
1953 Gallows Road, Suite 560
Vienna, VA 22182
Tel. (703) 847-6870   Fax (703) 847-6872

International

London
INPUT LTD.
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
Tel. (071) 493-9335 Fax (071) 629-0179

Paris
INPUT SARL
24, avenue du Recteur Poincaré
75016 Paris, France
Tel. (33-1) 46 47 65 65 Fax (33-1) 46 47 69 50

Frankfurt
INPUT LTD.
Sudetenstrasse 9
D-6306 Langgöns-Niederkleen, Germany
Tel. (0) 6447-7229 Fax (0) 6447-7327

Tokyo
INPUT KK
Saida Building, 4-6
Kanda Sakuma-cho, Chiyoda-ku
Tokyo 101, Japan
Tel. (03) 3864-0531 Fax (03) 3864-4114

FEDERAL PROCESSING SERVICES/ SYSTEMS OPERATIONS MARKET, 1989-1994

INPUT®

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1953 Gallows Road, Suite 560
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**Federal Information Systems and Service
Program**

*Federal Processing Services/
Systems Operations Market,
1989-1994*

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Abstract

INPUT estimates that the federal government processing services/systems operations market will increase from $1.36 billion in 1989 to $2.49 billion in 1994, a compound annual growth rate of 13%.

This higher growth rate will be fueled by increased spending at many agencies for GOCO and COCO activities. However, the markets for batch and interactive processing will remain essentially flat over the next five years, fluctuating only slightly from one year to the next.

The growing market reflects a continuing trend in the government to contract out many lower level, labor intensive activities. Also notable is the move to mission-based contracting by some agencies.

This updated report analyzes various operational aspects and strategies of the market and cites a number of specific procurement trends and key market issues. Agency selection criteria, vendor performance characteristics, OMB A-76, and contracting policies are also examined.

This report contains 165 pages, including 57 exhibits.

FEDERAL PROCESSING
SERVICES/SYSTEMS
OPERATIONS MARKET
1989-1994

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Introduction

Federal Processing Services/Systems Operations Market, 1989-1994 is a combined revision of two earlier reports issued on processing services and facilities management. The report has been prepared in response to continuing client interest in these changing markets. The 1989 update identifies market issues and trends that affect processing services and systems operations contractors and vendors entering the market through FY 1994. Insights into agency requirements and perceptions and contractor guidance are offered to help vendors plan their strategies to compete for federal services contracts.

This report was prepared as part of INPUT's Federal Information Systems and Services Program (FISSP). Reports issued through this program are designed to assist INPUT's U.S. industrial clients in planning how to satisfy future federal government needs for computer-based information systems and services. The report's findings are based on research and analysis of several sources, including:

- INPUT's Procurement Analysis Reports (PARs)

- OMB/GSA/NBS Five-Year Information Technology Plans for 1989-1994

- Interviews with leading processing services and systems operations contractors

- Federal agency GFY 1989 and GFY 1990 Information Technology Budgets

A
Scope

The period covered in the report is GFY 1989-GFY 1994. Vendor interviews were selected because they were either identified as contractors of record for existing processing services or systems operations contracts or listed as professional services vendors in INPUT's Vendor Analysis and Planning Service data base for 1988.

For the purposes of this study, INPUT defined processing services and systems operations to encompass the following categories of vendor products and services (see Appendix B for detailed explanations of each category):

- Processing services
- Processing services systems operations
- Professional services systems operations (GOCO)
- Network services
- On-site operations and maintenance

This report serves to supplement INPUT's previous reports on professional services. It is intended to give INPUT's clients a clear description of the current status and future trends of the federal market for processing services and systems operations. It also identifies the key vendors in the market, a subject of continuing interest in INPUT clients.

B
Methodology

In developing this report, INPUT used a variety of sources and methods. First, agency long-range plans and budget submissions for GFY 1989-GFY 1994 for major program replacements and new acquisitions were studied. Based on this research, INPUT pinpointed agencies and programs that related to processing services and systems operations.

INPUT also reviewed the Procurement Analysis Reports (PARs) to develop further insights on agency activities. Many PARs cover programs that for one reason or another do not appear in the agency budget submissions. This situation yields additional possibilities for further research.

Separate questionnaires were developed for agency officials and vendor respondents (see Appendixes F and G):

- The agency questionnaire was designed to acquire information about current experience and plans for future use of processing services and systems operations.

- The vendor questionnaire was designed to acquire information on industry status and future federal market plans.

Often the same or similar questions were asked of both groups of respondents for comparative analysis purposes. Federal agency officials selected for current interviews included:

- Agency executives at the policy level
- Program managers

Industry representatives selected for interview in this report included:

- Marketing executives
- Corporate executives
- Project/program managers of specific processing services and systems operations contracts.

The current versions of the Federal Information Resource Management Regulations, Federal Acquisition Regulations, Defense Acquisition Regulation (changes to FAR), and Multiple Award Schedule policy were investigated to identify changes that will impact professional services contracts and/or contract performance. OMB Federal Contract Reporting Center data for GFY 1988 were reviewed to identify contract sizes, duration, modification trends, and vendor market shares.

C

Report Organization

Besides the introduction and appendixes, this report consists of five chapters:

- Chapter II contains an executive overview describing the major points and findings in the report.

- Chapter III provides the market forecast and describes the major market issues and trends impacting the industry.

- Chapter IV summarizes the federal agencies' requirements for processing services and systems operations and the application areas supported by existing and planned operations.

- Chapter V presents the vendors' perspectives on the federal processing services and systems operations market.

- Chapter VI provides samples of business opportunities for programs and initiatives in the federal market involving processing services and systems operations.

Several appendixes are also provided:

- Interview Profiles
- Definitions
- Glossary of Federal Acronyms
- Policies, Regulations, and Standards
- Related INPUT Reports
- Questionnaires

Following the appendixes is a description of INPUT and its programs and services.
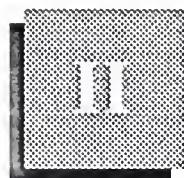
Executive Overview

A
Federal Market Pressures

The federal market for processing services and systems operations has recently experienced new growth. Exhibit II-1 summarizes the pressures driving this market.

EXHIBIT II-1

Federal Market Pressures

- Staff shortages
- Labor-intensive processes
- Mission contracting
- Cost cutting
- High attrition

Many agencies are facing both technical staff shortages and congressionally mandated limitations on full-time equivalents (FTEs), or employees. Processing services and systems operations provide a means for the agencies to overcome these limitations and allocate scarce FTEs to other functions. Vendor support in systems operations is especially helpful, because these operations tend to be a labor-intensive process at most agencies. Thus the FTE savings pay-off can be quite high. With the

exception of NASA and the Department of Energy (DOE), most agencies traditionally have used these services to support administrative systems. This approach is now changing. Agencies as diverse as the Treasury Department and the Navy are now using these services to support mission activities.

The federal market for processing services and systems operations is becoming extremely competitive, with sharp vendor discounting the norm. In processing services procurements, vendors are pricing very low, agency-estimated workloads, hoping that the actual workload will greatly exceed the estimate. In one extreme case, a vendor provided a 100% discount to its government customer.

Systems operations vendors are subject to potentially high attrition rates, particularly in major metropolitan areas. High attrition rates tend to drive up costs and lower service quality, thus damaging s firm's reputation. Many systems operations vendors are being trapped between the low charges necessary to win the business and high cost increases related to overcoming high attrition.

B

Market Forecast

INPUT expects the federal market for processing services and systems operations to grow from $1.36 billion in FY 1989 to $2.49 billion in FY 1994, at a CAGR of 13%. This estimate represents a sharp increase from last year's 8% forecast and reflects increased spending at many agencies for GOCO and COCO activities. See Exhibit II-2.

The markets for interactive and batch processing services will remain essentially flat over the next five years, fluctuating only slightly from year to year . The growth in end-user computing, particularly in the networking of more powerful microcomputers, is retarding growth in this market.

The growth in GOCO and COCO systems operations reflects a continuing trend by the government to contract out many lower level, labor-intensive activities. The Republican administrations of the 1980s have fostered the application of OMB Circular A-76, which relates to the contracting out of commercial activities, including systems operations. Another trend, that of adding post-implementation systems operations to large systems integration procurements, is also spurring the growth in this market.

EXHIBIT II-2

Federal Operational Support Market Forecast
1989-1994

| | GOCO | | Interactive Processing |
| COCO | | Batch Processing |
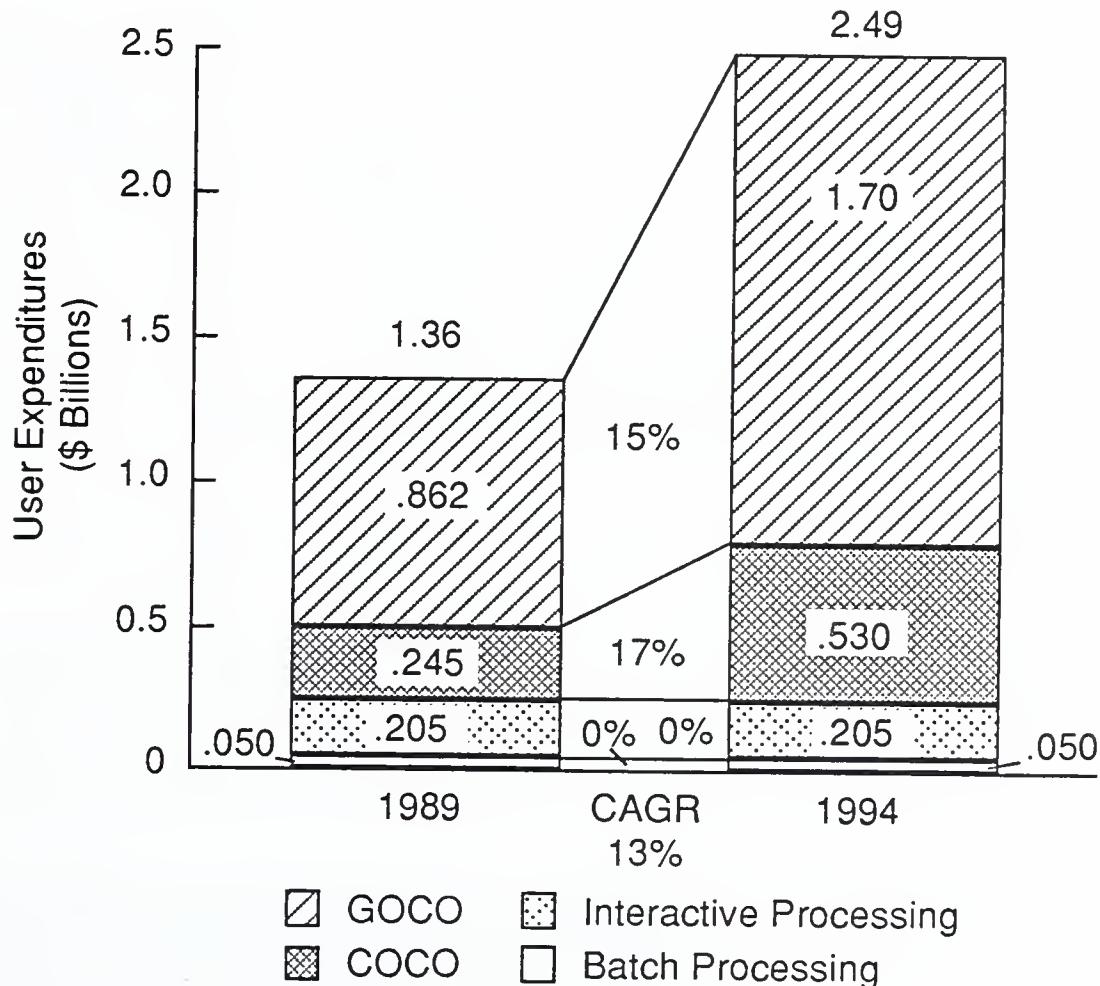
C

Leading Agencies

Exhibit II-3 lists the leading agencies in terms of processing services budgets for FY 1989 and FY 1990. The General Services Administration's (GSA) leading position reflects its role in supporting processing services activities for other agencies. Although Army and Air Force are next in processing services expenditures, the stated funding reflects only a small portion of their total Information Resources Management (IRM) budgets. At the other agencies, however, processing services spending is large. Traditionally, Treasury uses outside services to access data bases used in mission activities, as well as for administrative functions, including payroll. NASA and Energy both use processing services for a variety of mission-oriented functions.

EXHIBIT II-3

Leading Agencies in Processing Services Expenditures

Agency	$ Millions	
	FY 1989 Estimate	FY 1990 Forecast
GSA	40.7	37.9
Army	31.7	32.4
Air Force	21.4	21.5
Treasury	17.4	21.2
NASA	14.3	16.3
Energy	12.6	13.7

Identifying the leading agencies for systems operations is a bit more complex, because spending in this category comes from a variety of sources. However, it is generally accepted that NASA and Energy are the two leading agencies for systems operations. Unlike most other agencies, NASA and Energy use contractors for mission functions. They also use systems operations contractors to award contracts to other contractors.

Outside of these two agencies, the three major defense agencies (Air Force, Army, and Navy) round out the top five agencies using systems operations contractors, reflecting the large size of their overall IRM budgets.

D

Key Application Areas

Processing services and systems operations are supporting a wide range of federal application areas. While the two services differ somewhat in their emphasis, administrative and data base applications dominate both categories, as shown in Exhibit II-4. Administrative applications include such typical areas as procurement, payroll, and personnel. Data bases, for both agency and proprietary data, are also common in both categories.

EXHIBIT II-4

Key Application Support Areas

- Administrative
- Data base
- Scientific/statistical
- Mission support
- Text processing
- Project management

Scientific and mission-support activities are common for processing services, because agencies want to take advantage of outside expertise. Led by NASA and the Department of Energy, many agencies now use systems operations for mission support. However, agencies also use systems operations for both text processing and project management.

E

Leading Vendors

Many federal services vendors have contracts for both processing services and systems operations. Exhibits II-5a and II-5b list the leading vendors in each category. The inclusion of DP Associates reflects one FY 1987 contract. Otherwise the companies are fairly well known in both areas.

The only shift on the top five processing services vendors is the replacement of McDonnell Douglas with Dialcom, which had been ranked tenth in another (1988) INPUT report. This shift may in part reflect some invoicing problems which, according to GSA, McDonnell Douglas has been having for the past year.

EXHIBIT II-5a

Leading Vendors—
Processing Services

- Computer Sciences Corporation
- Boeing Computer Services
- Martin Marietta Data Systems
- Control Data Corporation
- Dialcom

EXHIBIT II-5b

Leading Vendors—
Systems Operations

- Computer Sciences Corporation
- Unisys
- Boeing Computer Services
- Lockheed
- DP Associates, Inc.
- Planning Research Corporation

II-6

F
Agency Satisfaction

In general, agencies show only a moderate level of satisfaction with vendor performance. Exhibit II-6 compares agency and vendor responses on a series of vendor characteristics. The close similarity in ratings suggests that vendor personnel understand fairly well the thinking at their agency customers.

EXHIBIT II-6

Agency Satisfaction with Processing Services/Systems Operations Vendors

Vendor Characteristic	Ratings*	
	Agency	Vendor
Quality of work	3.8	3.6
Quantity of work	3.7	3.5
Responsiveness	3.6	3.7
Delivery schedule	3.6	3.8
Project management	3.6	3.3

* On a scale of 1 to 5, 1 = lowest and 5 = highest level of satisfaction

The fact that no ratings exceed 4 suggests that mediocre performance is the norm. This finding is not surprising in view of the cost cutting necessary to win federal business. In a similar survey taken in 1987, agencies rated two processing services characteristics at 4 or above, with vendors rating three items above 4. Systems operations ratings have not changed all that much in the past two years, staying in the 3-4 range.

G
Recommendations

In penetrating the federal market for processing services and systems operations vendors need to control costs. The market has become so competitive, with extensive cost cutting employed in many cases, that it is becoming very difficult to increase market penetration. Some companies, in an effort to increase market share, are bidding the work at or below cost. They hope to regain profitability through contract modifications. However, without superior cost control, vendors have little chance to improve. Exhibit II-7 lists four ways for vendors to control their costs.

EXHIBIT II-7

Recommendations

- Increase use of advanced technology

- Expand contract usage

- Improve project management

- Minimize staff attrition

- Establish strategic alliances

By applying advanced technology, vendors can limit the growth of labor costs. The capital-intensive nature of some technology investments may limit market growth to those firms large enough to make the investments. However, even small and 8(a) firms can achieve some economies through the careful allocation of available resources.

Growing the business through expansion of contracted services also enables vendors to control costs by spreading the fixed costs over a larger business base. From the beginning of an agency contract vendors must look for ways to encourage their customers to increase the contracted workload.

Good project management and reduced attrition will also help to control costs. Project management methodologies can minimize loss of resource control and provide planning for more efficient use of both personnel and equipment resources. In major metropolitan areas, high attrition, particularly among lower level employees, can have a devastating effect on cost control efforts before the end of the first year of a contract. While retaining employees can sometimes be expensive, it is not nearly as expensive as replacing employees. Many lower cost steps that have relatively high payoffs can be taken instead.

Finally, processing services and systems operations vendors should establish strategic alliances to allow them to participate in more complex federal projects. Many systems integration (SI) projects include support requirements that can be met through either COCO or GOCO services and sometimes both. If the processing services and systems operations vendors subcontract to well-established prime contractors, they may capture more business. This in turn will enable them to participate in still larger projects.

II-8

III
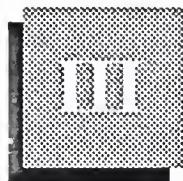
Market Analysis and Forecast

A

Market Structure

Processing services (PS), as described in Appendix B of this report, represents one of the six major delivery modes of the information services (IS) industry. The PS mode contains three primary service segments:

- Transaction processing services, which, for the federal market, relates to the term remote computing services

- Batch services, which plays a very minor role in the federal market

- Systems operations, usually called Contractor-Owned, Contractor-Operated (COCO) support in the federal market

For the purposes of this report, processing services systems operations is being combined with professional services systems operations (SO) of client-owned equipment, a subsegment of the professional services delivery mode. In the federal market, this version of systems operations is frequently called Government-Owned, Contractor-Operated (GOCO) facilities management.

These two delivery modes were combined in this report because:

- Together they cover all contracted computer operations, a significant activity in the federal market.

- Most companies active in one delivery mode (in the federal market at least) are also active in the other delivery mode.

- Agency decisions to contract in these modes usually arise from the same set of circumstances and reflect the same internal and external pressures.

For the purposes of this report, the combination of PS and SO will be considered Operations Support (OS), reflecting the service provided to government users. Appendix B provides more detailed information on industry structure in general and these delivery modes in particular.

Nearly ten years ago, GSA established a specialized contracting vehicle to handle PS activities. This vehicle, named the Teleprocessing Services Program (TSP), divides PS contracts into two categories:

- The Multiple Award Schedule Contract (MASC) consists of a TSP schedule of indefinite quantity type contracts with fixed unit prices and government-wide volume discounts.

- The Basic Agreement (BA) represents an arrangement between GSA and TSP vendors that contains terms and conditions but no prices, which governs future TSP procurements.

Section C in Chapter III contains a discussion of the roles that BAs and MASCs play, as well as a discussion of their evolution in response to administrative and technology changes.

B

Market Forecast 1989-1994

The federal market for operational support will grow from $1.36 billion in FY 1989 to $2.49 billion in FY 1994, at a CAGR of 13%. This growth represents a sharp increase from last year's 8% forecast and reflects increased spending at many agencies for GOCO and COCO activities. Exhibit III-1 provides a breakout of the four service segments included in operational support.

The markets for processing services business will remain essentially flat over the next five years, fluctuating only slightly from year to year. Batch business has been declining over the last few years, but is now flattening out. Up until last year, INPUT was reporting much higher numbers for interactive processing, exceeding $600 million. The change reflects a reduction of $445 million from the Health Care Financing Administration (HCFA), an agency of the Health and Human Services Department (HHS). HCFA previously reported, under the interactive processing category, its payments to contractors for processing Medicare claims. This past year, HCFA broke out those payments separately and therefore INPUT withdrew them from this market.

EXHIBIT III-1

GPFM

Federal Operational Support Market Forecast
1989-1994

User Expenditures ($ Billions)

1989: 1.36
- GOCO: .862
- COCO: .245
- Interactive Processing: .205
- Batch Processing: .050

CAGR 13%
- 15%
- 17%
- 0% 0%

1994: 2.49
- GOCO: 1.70
- COCO: .530
- Interactive Processing: .205
- Batch Processing: .050

Legend:
- � GOCO
- ▦ COCO
- ▨ Interactive Processing
- ☐ Batch Processing
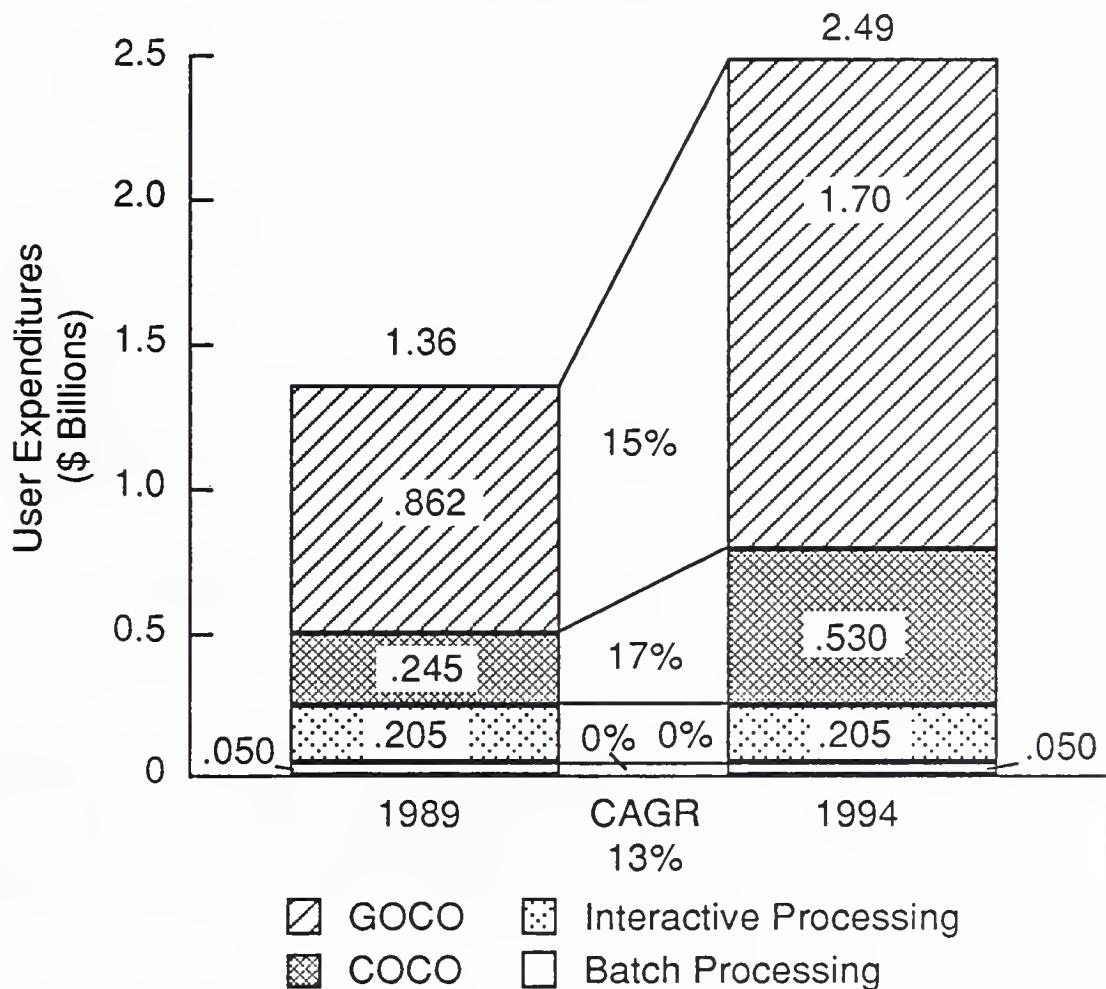
Without the HCFA payments, interactive processing spending is flat. The growing penetration of microcomputers, networked together and with larger systems, has facilitated local, as opposed to remote, processing. Although some agencies rely heavily on interactive processing, overall it is a fairly flat market.

By contrast, COCO and GOCO activities are growing sharply. These activities reflect a continuing trend in the government to contract out many lower level, labor-intensive activities. Traditionally, many scientifically oriented activities, such as those at NASA and the Energy Department, have contracted out their mission work. Other agencies contract out their administrative systems operations, while retaining the mission activities for government employees.

During the 1980s, Republican administrations have fostered the application and implementation of OMB Circular A-76. This document relates to the contracting out of what the administration considers to be commercial activities. Traditionally these activities have included many labor-intensive areas such as maintenance, cleaning, and guard activities. However, it also includes operation of computer facilities. Many in-house facilities, such as the Headquarters Computer Center at the Department of Transportation, have converted to contractor operations.

INPUT sees evidence of an acceleration of this trend, with more in-house facilities being converted to GOCO. Agency budget submissions in the spring of 1989 showed large increases for this category.

Finally, in a new, developing trend, several systems integration projects now include operational support. For example, the Agricultural Stabilization and Conservation Service (ASCS) is combining systems integration (SI) with systems operation to support its IRM integration activities. As more agencies seek total solutions to their information systems problems, this trend will likely accelerate.

Exhibits III-2 and III-3 show a breakout of this market between defense and civilian agencies. The civilian market is somewhat larger, but both are growing at about the same pace. The only significant difference is interactive processing, which shows the civilian market at nearly three times that of defense. This reflects the traditional stronger tendency of civilian agencies to contract out for processing services. Many civilian agencies must access commercial data bases to perform their mission. For example, the Treasury Department needs to track the federal funds rates and other key interest rate indicators, while the Agriculture Department must track the commodity futures market. Defense agencies, on the other hand, have less need to access external data bases.

EXHIBIT III-2

Defense Operational Support Market
1989-1994

GPFM

EXHIBIT III-3

Civilian Operational Support Market
1989-1994

GOCO ▨
COCO ▧
Interactive Processing ▫
Batch Processing ☐
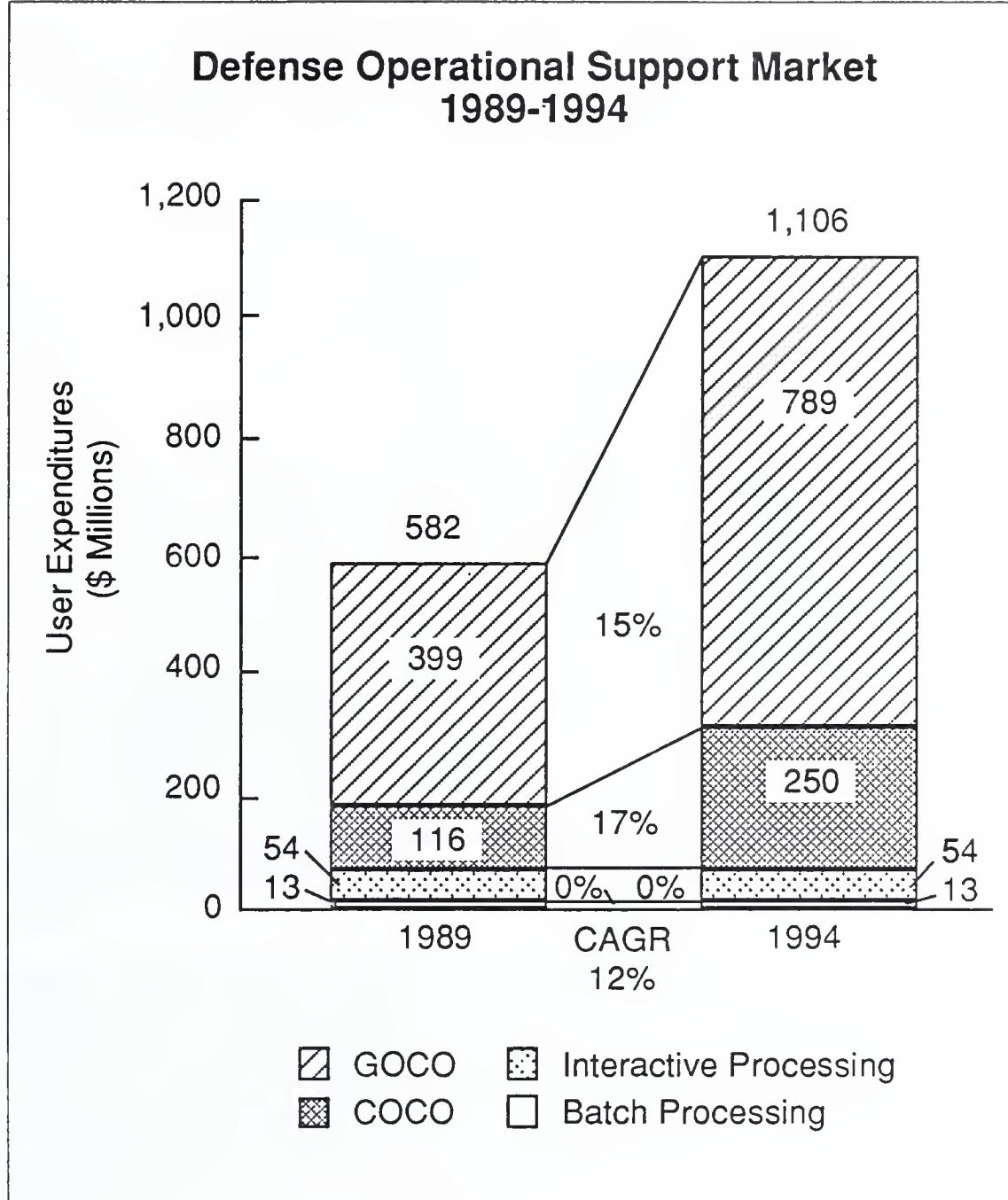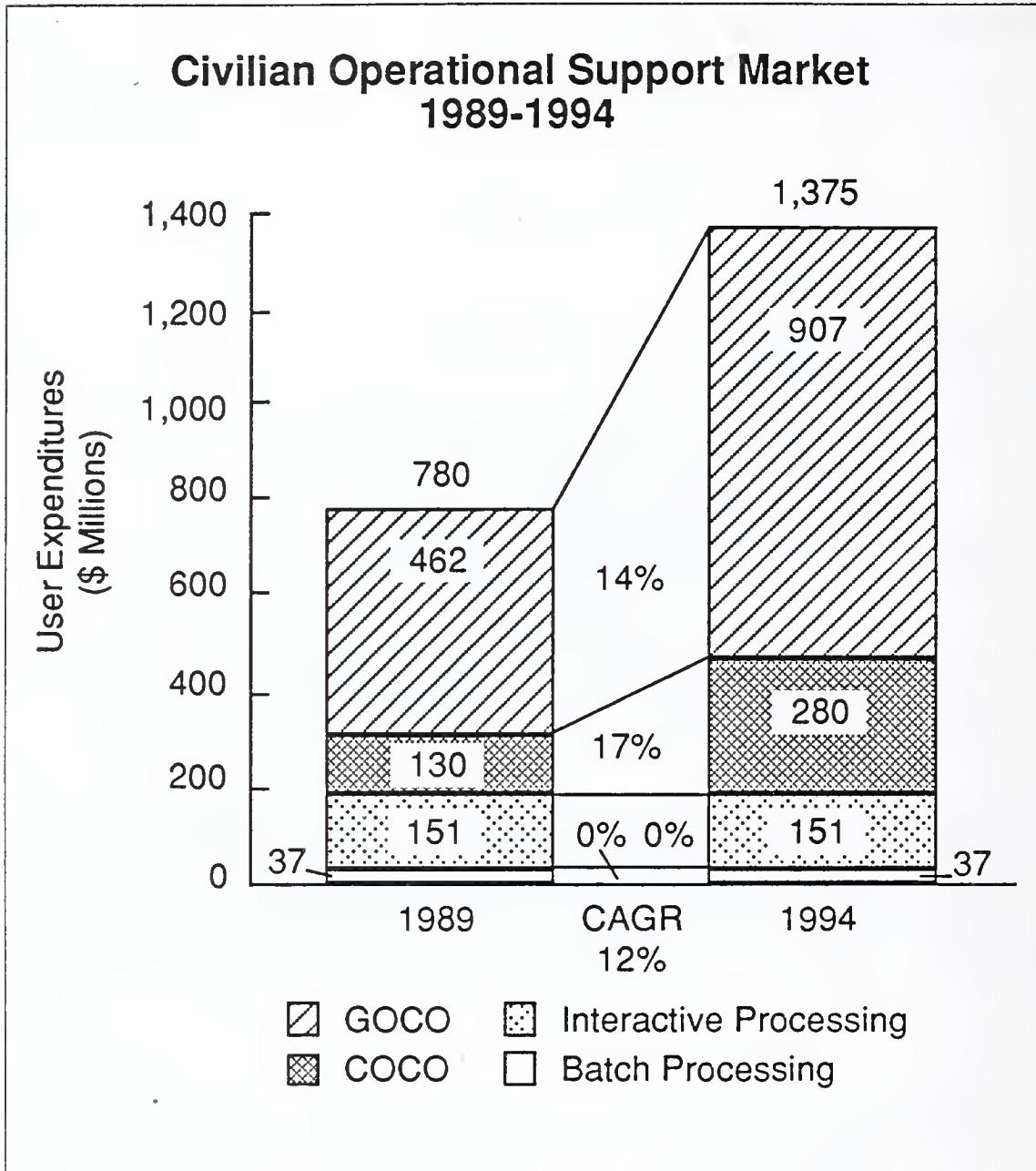
C
Federal Market Issues

During the two most recent past administrations, presidential task forces investigated the problems and technological status of the federal government's information processing resources. Findings are shown in Exhibit III-4. The investigations showed significant information technology (IT) shortcomings:

- The government has not taken full advantage of the technological advances of the private sector.

- A substantial amount of the automated data processing (ADP) inventory was already obsolete or rapidly becoming so.

- Federal executives have not managed ADP resources effectively.

III-6

EXHIBIT III-4

Federal Information Processing Weaknesses

- Slow to adopt new technology
- Obsolete ADP inventory
- Inadequately trained personnel
- Insufficient information processing for public needs

- Federal personnel were not adequately trained in the use of information technology.

- Major initiatives were urgently needed to bring federal information management to the level needed for regulation, taxes, security, and services to the public.

These findings, along with some fundamental changes in GSA's information systems (IS) management policies, led to gradual changes in IS procurements, including processing services and systems operations. The procurement changes, as well as the factors previously cited, have fueled the growth for federal operational support opportunities. INPUT expects this growth to be sustained for the indefinite future. Poor personnel practices have also supported this growth.

Systems acquisitions in the second half of the 1980s addressed needed improvements in management, administration, human resources, and logistics functions that had not received newer data processing resources in more than a decade. These changes have been reflected in the focus of operational support procurements. Congress urgently needs more precise and timely data for the legislative process. The administration's decisions require complete data on domestic issues and regulatory affairs in order to satisfy congressional mandates.

1. Historical Perspective

For nearly ten years, processing services procurements have been governed by GSA's Teleprocessing Services Program (TSP). This program instituted special procurement categories, MASCs and BAs. As other regulations changed, TSP also changed, evolving to mirror other federal procurement activities.

Earlier, federal ADP and telecommunications systems were procured and managed for more than two decades by the FPRs, FPMRs, and ASPRs. ADPE and services procurements, including processing services and systems operations, were modified by the 1966 Brooks Act and subsequent amendments.

The Paperwork Reduction Act of 1980 included a number of provisions concerning information resource management and system acquisition. The act:

- Created the office of Information Resources Management in each department and major agency

- Placed all but sensitive and mission-essential ADP under a new Mini-Brooks Bill

- Provided a separate approval procedure for national security and defense-mission ADP

- Authorized annual preparation and publication of a federal agency five-year plan for major ADP/telecom acquisitions by OMB and GSA

Most operational support contracts appear in agency budget documents, because spending is usually high enough to exceed the reporting threshold. Often, this support is coupled with SI or other purchases.

Under the authority of the Federal Administration Act and the Paperwork Reduction Act, GSA, in April 1984, prepared and made effective a new regulation for information systems. The Federal Information Resource Management Regulation (FIRMR) superseded the FAR and FPMR in information technology areas. GSA intended that the FIRMR would streamline the information resources acquisition process. GSA just completed a rewrite of the FIRMRs to reflect significant legal and regulatory changes, as well as to expedite procurements. However, with different versions of a new Paperwork Reduction Act pending in Congress, the FIRMRs will likely require further rewrite.

Other regulations and policy initiatives that are changing the acquisition procedures include:

- The Competition in Contracting Act (CICA) of 1985 proved expanded legal powers for ADP protest action via the GSA Board of Contract Appeals (GSBCA) and GAO, increased the opportunity to employ negotiated contracts, and established seven more restrictive categories of exceptions that permit sole-source awards. Agencies view the CICA as allowing vendors to complicate and lengthen the acquisition process. The act's provisions make it easier for vendors to protest procurement activities and bring temporary halts to procurement schedules. Virtually every major procurement, including those for operational support, has been protested under the CICA.

- The Paperwork Reduction Reauthorization Act of 1986 expanded the power of the GSBCA, but also retained the Warner Amendment, which provides the Department of Defense (DoD) with mission-critical ADP procurement exemptions to Brooks Act coverage, except for application of general-purpose ADPE in noncritical functions, such as testing, recalibration, and programmer workbenches.

At this writing, the Paperwork Reduction Reauthorization Act has expired, without replacement legislation being passed. A dispute arose between Congressman John Conyers, Chairman of the House Government Operations Committee, and Congressman Frank Horton, the ranking Republican on the committee. The dispute concerned the adjudication power of OMB's Office of Information and Regulatory Affairs (OIRA). Both congressmen submitted their own bills. In addition, Senator Jeff Bingaman submitted a third version of the bill. INPUT expects a reauthorization act to have passed in some form by the end of calendar year 1989. While OIRA may not lose any power, its accountability to the Congress may strengthen somewhat.

Several other issues have arisen that are now being studied. These include software rights, data rights, and second-sourcing of some systems. INPUT expects these issues to continue to create problems on some hardware procurements, but to have little effect on operational support.

As is well known in the vendor community, the CICA has not achieved what was expected. It was expected to improve competitive opportunities, while the GSBCA provided more equitable resolution of protests. The results have been anything but equitable. Today, virtually all major procurements are protested. A new word has entered the federal procurement vocabulary—fedmail. Some agencies and winning vendors are providing payments to protesters in order to secure withdrawal of the protest. As a result, a new growth industry is developing for lawyers

specializing in federal procurement. GSA's most recent studies suggest that fedmail is becoming less common, although it has not yet disappeared completely. Most successful protests result from one or more of the following defects:

- Failure to follow stated evaluation plans
- Procurement process inconsistencies
- Improper documentation
- Defective pricing
- Inconsistent information dissemination

GSA's limited procurement review of the past few years has eliminated much of the expert examination of procurement actions. Many vendors now believe that more review is needed. Some have even indicated that in certain circumstances losing can be more profitable than winning.

A new office in GSA has begun issuing quarterly reports on GSBCA activity. Based on analyses of protest decisions, it is apparent that evaluation procedures represent the biggest source of trouble. If agencies lock themselves into too tight an evaluation model, any deviation usually results in a sustained protest. Therefore, GSA has recommended more flexible evaluation models that give the selection official and contracting officer more latitude in comparing cost and technical considerations.

2. Budgetary Constraints

Future-year funding of current acquisition programs and approval of funding for the next budget year are always in doubt in the federal government market. The authorization of an agency budget and the requested information sources by the agency oversight committee do not assure the agency or vendors that funds will be provided in the out years. Appropriation acts for the agencies approve the Total Obligational Authority (TOA) for certain large systems, but not the fiscal year or years in which the funds will be available (called outlays). Given the continuing, monthly nature of these payments, it is doubtful, at least in the short run, that work would be curtailed sharply. It is fairly common, however, to eliminate the third shift if both the workload and the contract permit it. This arrangement might result from negotiations between the contractor and agency client.

Continuing economic and political sensitivity to the large national budget deficit could negatively impact a number of acquisitions in the less-than-critical defense and civil technology sectors. The current budget sequestration for FY 1990 will likely affect these areas, should it stay in effect. Major ADP systems already approved are likely to continue in preference to unapproved programs.

Major civil systems affect service to the public and have greater political appeal than research programs. Deficit control measures, especially those under the Gramm-Rudman-Hollings (GRH) Act, could force agencies to cancel programs that do not meet stringent productivity improvement requirements and, in some cases, delay or stretch those that do. However, Congress appears to be backing away somewhat from the GRH targets, and most agencies have not yet experienced any major effect from the act. The current budget sequester might change that.

INPUT expects budget difficulties to continue to constrain the federal information systems market, particularly on the Defense side. However, if the procurement process is simplified to reduce the protest volume, acquisitions should begin to increase. Many view information systems as key to productivity increases. Therefore, budget constraints sometimes lead to increased opportunities in the information systems market. Defense may find savings through more operational support contracts.

3. Software Integration and Productivity Improvements

Software is the interface medium between machines, applications, and end users. Agencies need strategies and vendor support to implement these integrations. Agency respondents in previous studies noted a growing need for portable software that is readily adaptable to a changing hardware environment. As new hardware technologies are put in place, the next generation of software must accommodate change and communications between incompatible equipment.

Processing vendors must offer new and innovative software to win market share, including:

- Programmers' workbench
- Artificial intelligence
- CASE technology

Similarly, agencies are increasingly required to merge large applications into a single, transparent software system that fits their end users' needs, rather than the government end users adapting their needs to the capabilities of the software.

To modernize software and initiate productivity improvement, agency ADP organizations are seeking greater use of the following:

- Software engineering technologies, including more-efficient software management methods, software development methodologies, and data dictionaries

- Higher-level development tools, including program generators and fourth-generation languages

- Better analytic tools for all sizes of machines—microcomputers, midsize computers, and mainframes—that will provide programmers with development aids such as automatic documentation, cross-referencing, etc.

One approach—data administration—provides techniques and software tools to arrange large amounts of data. By organizing, indexing, and cross-referencing data according to the business requirements of the organization, agencies are better equipped to plan procedures for the comprehensive development of future systems. Specifications from the American National Standards Institute (ANSI) are now being reviewed by agencies and vendors. Although a standard data dictionary software specification is some years away, vendors, especially of data base management systems (DBMSs), need to be cognizant of the pending impact of this trend.

Fourth-generation languages (4GLs) are being employed by agencies to increase productivity in software development and maintenance. Processing services arrangements allow agencies to try out new software without making a major financial commitment. Currently, 4GLs are used primarily for end-user computing and reports, along with some decision support. Other applications for 4GLs are being designed and eventually will ease the burden on agency staff; government computer resources experts are concerned with the demand on computing capability of 4GLs and, in the future, will look for 5GLs with improved efficiencies. Many information systems procurements include requirements for 4GL experience. Advanced hardware designs, including Reduced Instruction Set Computing (RISC), will make (traditional) inefficient 4GLs more feasible. In the future, hardware inefficiency will not be as important an issue.

4. Artificial Intelligence

Artificial intelligence (AI) is a market segment in which vendors are focusing on introducing new technology to the government, primarily in the areas of software development and decision support. Currently, expert systems (which are a popular subset of the family of AI capabilities) are being developed by agencies as standalone end-user production systems to automate knowledge-based processing. In meeting federal operational support needs, vendors must often include AI features as part of their offerings.

DoD is taking the lead in developing artificial intelligence programs. AI is providing useful training for analysts, and AI applications are being employed in tactical situations and support functions. Civil agencies are also developing and operating expert systems for large-scale information processing. In a previous report, INPUT noted that decision support

systems represent the most common government application of AI. However, AI is also being used in the development of micro security products.

According to AI industry sources, the current AI opportunities are in product-oriented services for prototype systems for the federal agencies. As in other software areas, the government is looking to industry for solutions, not just products. Therefore, in response to this trend, AI vendors are expected to migrate beyond standalone systems to new products that integrate approaches and solutions. AI is expected to aid in developing closer links to the main flow of an agency's information processing.

Many small AI vendors are focusing their marketing efforts on IS directors and are providing products to facilitate information storage and retrieval, data communications, and other typical management functions. Current federal prototyping efforts are demonstrating AI feasibility in those IS functions as well as other decision support areas. Areas in which federal workers must interview the public seem especially promising for AI. In a previous report, INPUT found that many federal AI applications were being used with specialized midsize computer systems.

5. Leading Vendors

In identifying and analyzing the leading vendors in processing services and systems operations, three different perspectives are worth examining:

- Objective contract sales data
- Agency views
- Vendor views

Each of these perspectives offer useful information to potential teaming partners and competitors in upcoming federal bids.

a. Objective Contract Sales Data

Exhibit III-5 lists the top ten systems operations vendors, according to objective information on contract obligations. CSC's market share was estimated independently, because the objective information on CSC appeared to be incomplete. Boeing Computer Services' place in a tie for second might be expected, because BCS has long been active in this market. Unisys's position, however, is somewhat surprising, as it is normally associated with computer equipment. However, because Unisys captured 104 separate contract obligations versus BCS' 30, it is obvious that Unisys has effectively penetrated this market. Much of its business is coming from the Transportation Department, the Johnson Space Center in Houston, and the Environmental Protection Agency (EPA).

EXHIBIT III-5

Top Ten Systems Operations Vendors' Combined FY 1987 and FY 1988 Market Share

Company	Market Share (Percent)
Computer Sciences Corporation (CSC)	20
Unisys	11
Boeing Computer Services	11
Lockheed Corporation	8
DP Associates, Inc.	6
Planning Research Corporation	5
Martin Marietta Data Systems	3
Vanguard Technologies Corporation	3
General Motors Corp. (EDS)	3
American Management Systems	3

Source: Federal Procurement Center Data

DP Associates had only one contract in FY 1987, which accounted for more than $22 million. In FY 1988, its 15 contracts were worth only $2.7 million. If only the latter year were considered, DP Associates would not have made even the top 20. The remaining companies are well known in this market; the list contains no additional surprises.

In previous years, GSA regularly published the leading vendors under its TSP categories, and these lists could be combined under the processing services category. However, in recent years, several vendors have had problems with their invoicing procedures, preventing GSA from compiling accurate, objective sales information for the MASC area.

Exhibit III-6 lists the top five vendors for FY 1989 in the Basic Agreement area. The company not widely known, Intelligent Information Systems, derived most of its revenue from work at the Senate. Without this work, Control Data would have ranked fifth. Exhibit III-7 lists the top vendors in the MASC program for FY 1987. Because of the invoicing problems, more recent data is not available. This is unfortunate, since MASC revenues greatly exceed those for BA. MASC orders for FY 1987 exceeded $93 million, although actual service delivered was only about $56 million. By comparison, FY 1989 BA sales were approximately $44 million.

EXHIBIT III-6

Top Five Vendors FY 1989
Basic Agreement Sales

Rank	Company	Market Share (%)
1	Computer Sciences Corporation (CSC)	37
2	Boeing Computer Services	21
3	Martin Marietta Data Systems	17
4	Intelligent Information Systems	7
5	Electronic Data Systems Corporation	6

Note: No data available for McDonnell Douglas Corp.
Source: *FY89 BA Sales, Summary Report*, General
Services Administration

EXHIBIT III-7

Top Five Vendors TSP MASC—FY 1987

Rank	Company	Market Share (%)
1	Computer Sciences Corporation (CSC)	20
2	Data Resources	9
3	Martin Marietta Data Systems	9
4	Control Data Corporation	9
5	DIALCOM, Inc.	8

Source: *FY87 TSP MASC Summary*,
General Services Administration

b. Agency Views

INPUT interviewed agencies for their views of the leading vendors in each of these markets. Exhibits III-8 and III-9 show their selections for top-ranked vendors. While agencies responded with a large number of firms, no clear ranking evolved among the top mentions for systems operations vendors. The only surprise among the top listings is CDSI. It may be that agencies are confusing companies. CDSI ranked only fiftieth on the sales list, while CBSI ranked fourteenth. All the other companies listed on Exhibit III-8 also ranked in the top ten on the previous exhibit.

GPFM

Agency Views of Leading Federal Systems Operations Vendors

Companies mentioned*

- Computer Sciences Corporation

- CDSI

- Unisys

- EDS

- Martin Marietta Data Systems

- Boeing Computer Services

* No ranking due to diversity of mentions

Exhibit III-9 lists agency rankings of the top processing services vendors in the federal market. There are no particular surprises here, because all the companies are well known. Currently, a leading commercial processing services firm, G.E. Information Systems, is pursuing the federal market heavily. It recently won a major GSA contract for Electronic Data Interchange (EDI) services by offering a 100% discount to the agency. GSA's trading partners will pay standard rates. It is likely that another survey, taken a year or two from now, will include G.E. For more information on the G.E. award, consult a companion INPUT report, *The U.S. Federal EDI Market, 1989-1994*.

EXHIBIT III-9

Agency Ranking of Leading Federal Processing Services Vendors

Company	Rank*
Boeing Computer Services	1**
Martin Marietta Data Systems	1**
Computer Services Corporation	3
McDonnell Douglas	4
EDS	5**
DIALCOM	5**

* Rank based on frequency of mention
** Tie in ranking

c. Vendor Views

Exhibits III-10 and III-11 present corresponding vendor rankings on these same markets. Again, CDSI makes the list, despite its relatively low objective ranking. The inclusion of OAO is surprising, since it does not even make the list for the top 130 vendors. At the time the survey was conducted, OAO was locked in a dispute with Vanguard Technologies over an IRS support contract. Because Vanguard is so closely identified with systems operations, some respondents likely made the connection. However, that IRS contract covers other forms of professional services and does not include systems operations.

Exhibit III-11 lists vendors' ranking of the leading processing services firms. The only new company here is Litton, which had not made the agency survey. While Litton has provided timesharing services to government agencies for many years, it has usually not been considered a leading vendor. Its inclusion here represents a definite plus for Litton, suggesting it has gained some credibility with its fellow vendors.

III-18

EXHIBIT III-10

Vendors' Rankings of Leading Companies for Systems Operations Services

Company	Rank*
Computer Sciences Corporation	1
Vanguard Technologies	2
EDS	3
PRC	3
OAO	5
Martin Marietta Data Systems	5
Unisys	5
CDSI	5

* Based on frequency of mentions by industry respondents

EXHIBIT III-11

Vendors' Ranking of Leading Companies for Processing Services

Company	Rank*
Computer Sciences Corporation	1
EDS	2
Boeing Computer Services	3
McDonnell Douglas	4
Martin Marietta Data Systems	5
AMS	5
Litton	5

* Based on frequency of mentions by industry respondents
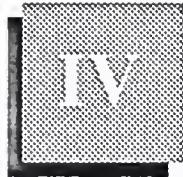
Federal User Requirements and Trends

A
Significant Problems/ Issues

1. Budget and Personnel Constraints

Most federal agencies do not have the staff required to support the quality or quantity of IS-supported services demanded by Congress and the American people. Agency respondents noted that the current federal personnel policies have kept government agencies from hiring and retaining enough qualified IS staff. Hiring ceilings and low salaries were cited as the main reasons leading to the increased attrition rate in the government and the growing use of contractors for operational support. In most metropolitan areas the problem becomes even more acute, as attrition rates among agencies and their contractors tend to be significantly higher. This higher rate arises from the larger number and variety of jobs available in metropolitan areas.

The federal government cannot competitively recruit against the financial rewards offered by the private sector. Furthermore, the personnel policies contain outdated standards and job descriptions and impose severe administrative problems. Some resolutions to these problems are being developed. Currently, agencies are working with the Office of Personnel Management to upgrade procurement professionals and give greater support to contracting personnel.

However, in many cases it can still be difficult to manage operational support contracts effectively. Processing services contracts might be written in such a way as to show sharp price increases when workloads exceed estimates. In the labor-intensive systems operations contracts, workload volume can also affect cost.

2. OMB Circular A-76 Impact

In 1966, OMB issued Circular A-76 to introduce cost competitions between the government and the private sector. This policy stated that the cost of the function being accomplished by agency employees must be compared with the costs of contracting with the private sector, and that the most economical way of doing the work be selected.

Since its inception, OMB Circular A-76 has reinforced the government's policy of not competing with the private sector. The circular supported three main precepts of the policy:

- Rely on the private sector to provide those goods and services that are available competitively.

- Retain in-house the governmental functions, such as regulation, monetary transactions, intelligence, and military services, and have them performed by government personnel.

- Achieve economy and productivity by using the most cost-effective government or industry source available.

In the early 1980s the government began allowing its Federal Data Centers to compete with vendors for some type of operational support contracts. This competition caused some concern in the industry, because of the apparent potential to lose business back to government agencies. However, this concern has largely been unfounded. A few Federal Data Centers, such as the large one at NIH, seem to thrive. However, for the most part, these centers have had only a minor effect on the federal market for operational support.

The A-76 program was included as a Reform '88 initiative because it was seen as a program that would encourage agencies to manage their activities more efficiently. Economical and more extensive use of computer and communications technology still remains the objective of the overall A-76 program.

Despite the program endorsement by many government and industry leaders, its implementation has been slow and incomplete. Agencies that are unclear about their goals and objectives are reluctant to cunduct studies. The agencies also lack commitment of manpower and resources, which limits the size of the study. Furthermore, in cases where the agency has many options for management techniques and levels of operations, industry usually has a greater chance of identifying efficiencies and obtaining a contract.

Between FY 1984 and FY 1988, 63,636 FTE positions at government agencies were subject to A-76 studies. The positions were primarily in Defense, GSA, Transportation, and Commerce. Even though Defense has accomplished the largest share of A-76 studies, only a small portion of the 14,000 ADP-related jobs at Defense have been studied. Furthermore, of those ADP positions studied at Defense, only 7% have been contracted out.

All agencies still fall short of the OMB goal. In an effort to increase A-76 studies, bonuses are now being given to federal workers for activities that complete A-76 studies. However, still more motivation and flexible implementation approaches are needed if A-76 is to become more successful in its achievements.

Agency respondents were asked to identify the impact of OMB A-76 on their contracting for processing services and systems operations. Most respondents indicated minimal impact from A-76 studies. Other respondents cited cost savings and additional contracting out of systems operations functions. Additional applications contracted out under A-76 studies included administrative, mainframe computer operations, and functions at central data centers.

The majority of agencies indicated that a small percent (10% or less) of their agency's/organization's COCO and GOCO service contracts were being implemented following an OMB A-76 review. A few agencies reported 100% implementation-following-review rate. Although most agencies have completed only a small number of studies, the tendency has been to contract out large programs and retain programs in-house for agencies that are more structured and committed.

B

Budget and Application Distribution

1. Processing Services Budgets

Federal agencies acquire data processing services from vendors and other federal data centers on the basis of approved information technology budgets for each fiscal year. Each agency identifies anticipated expenditures in the OMB Circular A-11 Section 43 budget submission. A comparison of the FY 1989 estimate and FY 1990 forecast budget requests of the leading agencies is shown in Exhibit IV-1.

GSA, Army, and Air Force are the three agencies with the largest budgeted amounts for processing services for both years. Treasury, Energy, and NASA have shifted in amounts over the past years, but still remain within the top ten agencies in budget size. The remaining agencies in the exhibit traditionally have been the largest users of processing services.

EXHIBIT IV-1

Leading Federal Agencies' Processing Budgets for FY 1989 and FY 1990

Agency	$ Millions	
	FY 1989 Estimate	FY 1990 Forecast
GSA	40.7	37.9
Army	31.7	32.4
Air Force	21.4	21.5
Treasury	17.4	21.2
NASA	14.3	16.3
Energy	12.6	13.7
Veterans	11.8	12.6
Interior	10.3	9.4
Labor	9.8	10.7
Commerce	7.1	5.9
Housing and Urban Development	6.8	7.2
Transportation	6.0	7.7
Agriculture	5.9	7.2
Army/Corp. of Engineers	5.7	6.0
Health and Human Services	4.9	5.2
Education	4.8	4.2
Navy	4.5	4.2
Office of the Secretary of Defense	4.4	4.8

Source: FY 1990 OBM A-11 Section 43A reports submitted by agencies to OMB

The Army and Air Force totals actually represent smaller percentages of their budgets than at Treasury and NASA. In general, defense agencies tend to commit a smaller portion of their budgets to ADPE Time (the budget line item in the form 43A) than do the civilian agencies. Treasury, for example, accesses external data bases and external econometric models for much of its mission work. And, on the administrative side, in the past Treasury's non-IRS payroll was run on a timesharing system.

GSA's budget includes payments into the ADP fund. The agency itself spends considerably less for outside data processing services to satisfy its own needs. The GSA collects and disperses the ADP funds for certain government-owned computer centers.

The ADP fund is used by agencies to acquire outside data processing services and equipment not funded in their current authorizations. Exhibit IV-2 summarizes the GSA ADP Fund Sales to Agencies Report for FY 1987 and FY 1988. The GSA Near System identifies the expenditures by agencies for the Teleprocessing Service Program (TSP), Federal Data Processing Centers, Lease and Contract Services Programs.

EXHIBIT IV-2

FY 1987 and FY 1988 ADP Fund Sales to Agencies

	FY 1987		FY 1988	
	Revenues ($ Millions)	Percent of Total	Revenues ($ Millions)	Percent of Total
Teleprocessing services program (TSP)	36.3	14	29.6	11
Federal data processing centers	30.8	12	41.4	15
Other (includes lease and contract service programs)	186.4	74	205.2	74
Total ADP fund expenditures	253.5	100	276.2	100

Source: GSA Records - Near System, FY 1987 and FY 1988, Information Resources Management Services, General Services Administration

Total ADP fund expenditures have increased during the past few years. For FY 1986, the total ADP fund expenditures were $219.4 million. The fund grew to $253.5 million in FY 1987 and to $276.2 million in FY 1988. The increases come from greater use of the federal data processing centers and contract services programs. The growth of these portions of the GSA-administered processing services segment represents a continuing erosion of the federal marketplace available to contract vendors.

Exhibit IV-3 compares the FY 1988 expenditures for the TSP, Federal Data Processing Centers, and the FY 1988 processing services budgets for ten of the leading user agencies. For the civilian agencies, Treasury and Interior have the largest expenditures and budgets, while for the defense agencies, the Army and Navy are the largest users. However, the Air Force outpaces the Navy in expenditures for federal data centers. It is interesting to note that the expenditures for the Navy's use of data centers exceeds its OMB A-11 budget, therefore indicating use of other funding sources, as is common for acquiring these types of processing services.

The Treasury and Army have the largest OMB processing services budgets and their combined TSP expenditures and Federal Data Processing Center expenditures together account for roughly one-third of the agency's processing service budget. The Air Force spends approximately 50% of its processing services budget from these two areas of expenditures. Energy and Interior, although large users in one of the expenditure areas, spend a considerably lower share of their total processing budgets from the combined total expenditures for the TSP and federal data centers.

Agency respondents were asked to identify the amount budgeted in yearly expenditures for both processing and facilities management systems/operations services. Many agency respondents declined to estimate their agency's budgets. However, of the respondents that replied, 67% indicated that yearly expenditures for processing services were in the $1 to $5 million range. The distribution of budgets for systems operations was more dispersed. Forty-four percent of the respondents estimated having budgets of more than $5 million.

2. Systems Operations Budgets

Budgets for systems operations services by federal agencies are included as part of other service categories in the agencies' OMB A-11 budget submissions. However, as an example of the magnitude of funding for systems operations, NASA's systems operations budget is growing from $102 million in FY 1988 to $155 million in FY 1993 at a compound

EXHIBIT IV-3

Comparison of FY 1988 Processing Services Expenditures and Leading Agencies' OMB A-11 Processing Services Budgets

Agency	$ Millions		
	TSP Expenditures	Federal Data Processing Center Expenditures	OMB A-11 Processing Services Budget
Treasury	3.7	2.9	20.4
Army	2.9	7.6	31.1
Navy	2.9	4.9	4.6
Interior	2.3	0.4	10.9
Air Force	1.8	7.3	18.5
Health and Human Services	1.8	1.2	4.2
Justice	1.4	1.2	2.4
Agriculture	1.2	0.5	5.6
Energy	1.2	0.2	13.8
Defense	1.1	2.3	5.9

Source: GSA Records, Near Systems, FY 1988, Information Resources Management Services, General Services Administration and FY 1988 OMB Circular A-11 Section 43—Agency Information Technology Budgets

annual growth rate (CAGR) of 9%. NASA's budget is higher than that of most agencies, because NASA uses systems operations vendors for both operations and management activities. By contrast, the Defense Logistics Agency (DLA) is spending only about $2.5 million annually on systems operations. These numbers were derived for INPUT's Market Analysis Reports on NASA and DLA.

3. Processing Services Applications

The current processing services applications at agencies are listed in Exhibit IV-4. Administrative type applications are most frequent. Data bases of both agency data and proprietary data remain common at agencies.

EXHIBIT IV-4

Current Agency Applications of Processing Services

Application	Percent of Agency Respondents
Administrative	67
Data base—agency data	58
Data base—proprietary	58
Scientific/statistical	58
Mission support	50
Econometrics/planning models	42
Personnel/payroll/ recruiting	33
Financial/accounting	33
Text processing	33
Project management	25
Inventory tracking	17
Logistics/simulation	17
Engineering processing	17

The majority of the agencies also run applications that are tailored specifically to support scientific and agency missions. Lastly, logistics and engineering are the least prevalent applications among agency respondents. Currently, these applications are more likely to involve an established large or midsize computer system.

Exhibit IV-5 shows the agencies' views of future applications for processing services. Data bases are in first place, especially those with network requirements, which appear to be most effective in the interactive processing environment. For other applications areas, there is little agreement among respondents. "New applications" did not commit to any specific use, but rather to additional applications that develop with more technological advancements and user expertise.

EXHIBIT IV-5

Agencies' Views of Future Applications for Processing Services

Applications	Number of Times Mentioned
Data bases with networks	12
Public access data bases	10
New applications	3
Specialized software	2
Modeling	2
DBMS	1
Administrative	1
Architectural design	1
Resource utilization	1
Military reclassification	1

Most of the future applications will be directed to the management and processing of the large volume of information that federal agencies must collect and maintain in order to effectively perform their programmatic activities. However, more of the future information exchange will be handled in an end-user environment that necessitates a greater degree of user friendliness for the development of these applications. Furthermore, information that supports the agency's mission often must be shared across functional and geographic boundaries. This sharing requirement encourages some agencies to install LANs or increase the existing computer network into a more widely distributed environment.

Another impact on future processing services applications arises from the increasing trend among federal agencies to downsize applications to smaller computer equipment. Previous INPUT studies of both the midsize and large-scale systems markets found that downsizing is most apparent from the federal agencies' increased reliance on commercially available spreadsheets and other software packages geared to microcomputers. Management systems were also mentioned as targets for downsizing. In some cases the agencies are supplementing their mainframes' management systems with smaller systems, while other agencies are off-loading most parts of their management systems to micros. The smaller systems often can be handled by trained in-house personnel. In addition, general data entry and information processing (mission-oriented systems) are being downsized by agencies. This effectively limits the growth of processing services at many agencies.

4. Systems Operations Support Applications

As shown in Exhibit IV-6, a similar portion (42% each) of agency respondents are currently using systems operations services for administrative, mission support, and agency data base applications. These applications are also most prevalent for processing services operations.

Agencies also use systems operations vendors for personnel and financial applications. In the previous study, several unique technical applications were cited frequently by agency respondents. However, these technical applications were not currently reported by the agencies. This may reflect either the growth of general-purpose facilities or the particular sample that INPUT surveyed. Typically, unique systems operations facilities are supplied to those agencies that contract out for mission support activities. At NASA and the Department of Energy, systems operations support extends to giving contracts for specialized applications to other vendors that function as subcontractors.

EXHIBIT IV-6

Current Agency Applications for Systems Operations Services

Application	Percent of Agency Respondents
Administrative	42
Mission support	42
Data base—agency data	42
Data base—proprietary	33
Personnel/payroll/ recruiting	33
Financial/accounting	33
Text processing	33
Project management	25
Logistics/simulation	25
Econometrics/planning models	25
Scientific/statistical	25
Inventory tracking	17
Engineering processing	17

C
Agency Perceptions

1. Similarities/Differences between Processing Services and Systems Operations

Agency respondents were asked to identify any similarities and/or differences that they perceive between processing services and systems operations. Similarities included use of computers, accomplishment of specific tasks, and vendors being on-call for end-users.

The respondents noted very few differences. Those mentioned are categorized and summarized below:

Processing Services	**Systems Operations**
• Emphasis on data and computers	• Emphasis on management and personnel
• Vendor delivers final product	• Agency defines needs and product development

These differences reflect how the agencies perceive the support. With processing services, agencies have relatively little personal contact with vendors personnel. Interaction is normally limited to a help desk at the other end of the telephone number.

Systems operations personnel, on the other hand, usually work right at the agency site, use the same agency cafeteria, and see agency personnel everyday. As a result, it would be expected that agency respondents would emphasize management and personnel issues.

2. Use of Contractor Support

INPUT asked agency respondents which types of services they acquired in connection with processing services or systems operations. Exhibit IV-7 summarizes the results. The results show that the traditional timesharing services led the way, with GOCO support less common. Traditionally, processing services have played a major role in federal IRM contracting. This led GSA to establish the TSP program, making it easier for agencies to contract for these services.

Agencies needed special guidance and assistance because contracting for processing services involved several unique issues that did not arise in other types of procurements. For example, vendor charging algorithms are highly complex and proprietary, with no comparable discipline in other types of contracts.

Agency respondents were also questioned about the extent that LANs replaced the acquisition of processing services from outside sources. Nearly all agency respondents (92%) noted that, at present, there has been no significant impact from LANs, but there may be some in the future. For those agencies interviewed, LAN usage currently is concentrated in the areas of word processing, office automation, and MIS.

EXHIBIT IV-7

Current Agency Use of Processing Services and Systems Operations

Service	Percent of Agency Respondents
Remote computing services (timesharing)	92
Batch processing	92
Local area networks (LANs)	83
On-site operation and maintenance services	67
Distributed processing services	33
Professional services facilities management (GOCO)	33
Processing facilities management (COCO)	25
Value-added networks (VANs)	25

3. Reasons for Using Processing Services or Systems Operations

Respondents use vendor-furnished COCO and GOCO services to satisfy a wide range of data processing requirements in technical, administrative, and programmatic applications. Exhibit IV-8 gives the agencies' most frequently mentioned reasons for current usage of either processing services or systems operations.

EXHIBIT IV-8

Reasons Agencies Use Processing Services and Systems Operations

Processing services used when agencies:

• Lack equipment and skills in-house

• Lack in-house staff

• Have urgent requirements

• Have cost considerations

• Want to fix responsibility with vendor

Systems operations services used when agencies:

• Need specific tasks accomplished

• Have available computer capacity

• Already have existing contracts

• Have cost considerations

• Need more control over project

Because agencies cannot always readily acquire additional staff or equipment, they turn to vendor services. Cost considerations have increased in importance as a deciding factor in view of A-76 reviews and tight agency budgets. Although not mentioned very frequently, agencies also look to outside vendors with special expertise because the agency's data processing requirement is unique and would not readily adapt to existing or usual processes or configurations.

Some agencies will not use either processing or operational support services for internal reasons (such as security, sensitivity, location, or concern about control). A number of smaller civil agencies simply lack the data processing volume or budget to use the latter service since the expenses cannot be justified.

4. Advantages/Disadvantages of Processing Services

Exhibit IV-9 indicates the diversity of advantages and disadvantages for agency use of processing services. There is no frequency pattern or ranking of these factors due to the wide range of responses.

EXHIBIT IV-9

Advantages/Disadvantages of Contracted Processing Services

Advantages

- Flexibility of advanced hardware technology

- Cost/economies of scale

- Place responsibility with vendor

- Staff availability

- Variable usage

Disadvantages

- Vendor establishes priorities

- Lack close control

- Lengthy procurements

- Lengthy schedules and benchmarks

The advantages that the agency respondents identified are similar to the reasons stated earlier for use of processing services: staff availability and cost factors. Also, the respondents cited the advantage of having the flexibility to use more advanced hardware technology than what they may have been able to acquire independently. Having vendors responsible for the project is advantageous to many agencies. Numerous surveys that INPUT has conducted in the last few years have highlighted the importance of risk management to agency personnel.

However, the lack of close control by the agency personnel while the application is processed by vendors is viewed by some agencies as a disadvantage. Also, some agencies find it disheartening that the vendor establishes the priorities for the processing services operation. This is especially sensitive for agencies with tight deadlines and high visibility. Other disadvantages mentioned included the lengthy procurement process and lengthy schedules/benchmarks, which are indicative of not just processing service contracts but most of the federal marketplace.

5. Advantages/Disadvantages of Systems Operations Services

Agency respondents also noted a diversity of advantages and disadvantages of their use of systems operations, as listed in Exhibit IV-10. No frequency pattern or ranking of these factors is available.

EXHIBIT IV-10

Advantages/Disadvantages of Systems Operations Services

Advantages

• Local control

• Fix responsibility with vendor

• Obtain specialized assistance

• Flexibility of operations

Disadvantages

• Agency has less control

• Personnel turnovers

• Cost

Control is viewed as both an advantage and disadvantage to the agency respondents. They found it advantageous to have local control at a facility. However, respondents also viewed as a disadvantage to the agency the diminished direct managerial and/or technical control that occurs with contract operations.

Agency respondents indicated that systems operations is a means of obtaining specialized assistance and flexibility not available in-house. Under vendor.operations, the government does not need to maintain or manage extra staff for peak or unusual requirements. Furthermore, because many agencies are subject to FTE restrictions, use of contractors enables some agencies to conserve scarce FTE resources.

Agencies remain mindful of the impact of personnel turnovers and view the constant vendor staff turnovers as a disadvantage. This is especially true in major metropolitan areas, where turnover can be quite high, reaching annual rates of 40 to 50%. Also of concern is the loss of operational continuity during change-overs between contractors. However, most successor contractors (the new winner of the contract award) hire large numbers of personnel from the incumbent firm, especially in rural areas. Some agencies viewed as more costly the use of outside contractors. Most agencies, however, view the use of contractors as a means of cost avoidance, especially in hiring and training in-house staff and the costs related to changing staffing levels.

6. Importance of Vendor Characteristics

Exhibit IV-11 summarizes agency ratings of the relative importance of specific vendor characteristics in the award of processing services and systems operations contracts. Staff experience and support capabilities tied for the highest ratings. These two characteristics most clearly support the agencies' view that they use processing services and systems operations to supplement shortages of in-house staff.

Application functional experience and price were also important characteristics of vendors. These would be more appropriate in specialized support. Vendors need to have the processing and management expertise related to applications to be run for the agencies. Vendors also need to supply these services at competitive prices, as cost is given a relatively high rating by the agencies. As noted in Chapter III, this issue is viewed unfavorably by vendors facing increasing price reduction pressures of competition.

In processing services, competitive prices may mean deep discounts. Many contractors for processing services involve cost benchmarks. A given workload is run on different systems, with the award going to the lowest price. This represents a risk to the agencies, because the vendors may establish a low-priced window for the agency built around the benchmark workload. However, if the agency workload substantially exceeds the benchmark estimates, costs may rise sharply and unexpectedly. Various techniques exist to overcome this problem, but the agencies are not always careful enough.

EXHIBIT IV-11

Agency Ratings of Vendor Characteristics in Contract Awards

Characteristic	Relative Importance	
	Vendor Rating*	Agency Rating*
Staff experience	4.4	4.0
Support capabilities	4.4	3.5
Application functional experience	4.2	3.7
Price	4.2	4.6
Computer reliability	4.1	3.9
Hardware experience	4.0	3.5
Software development experience	3.9	3.7
Documentation	3.5	2.8
Federal contract experience	3.5	3.6
Training capabilities	3.5	3.1
Agency experience	3.4	4.1
Incumbent contractor	3.2	3.6

Ratings based on scale of 1 to 5; 5 = most important and 1 = least important.

Vendors viewed most of these factors at a lower level of importance. However, they did rate price higher than the agency respondents. This obviously reflects their sensitivity to price considerations in a fluid or unclearly defined workload estimate.

Agency experience and incumbency were given the lowest ratings by agency respondents. Therefore, for contract awards, the company's government-related experience in the areas of processing and systems support does not seen to contribute as much weight as might have been expected. It should be kept in mind, however, that this represents an agency perception. The exhibit also shows that vendors rate agency experience much higher. From their viewpoint, this experience may be critical to receiving the work.

IV-18

7. Agency Satisfaction with Vendor Performance

The overall satisfaction level of agency respondents with vendor performance characteristics is moderate, showing neither unusual strength or weakness. Exhibit IV-12 reflects the rating responses given to each factor regarding specific vendor characteristics.

EXHIBIT IV-12

Agency Level of Satisfaction with Vendors

Vendor Characteristic	Agency Rating	Vendor Rating
Quality of Work	3.8	3.6
Quantity of Work	3.7	3.5
Responsiveness to Agency Needs	3.6	3.7
Delivery Schedule(s)	3.6	3.8
Project Management	3.6	3.3
Cost	3.3	3.7
Development Visibility	3.3	3.2

Scale: 1 (Low Satisfaction) to 5 (High Satisfaction)

Ratings based on scale of 1 to 5; 5 = most important and 1 = least important.
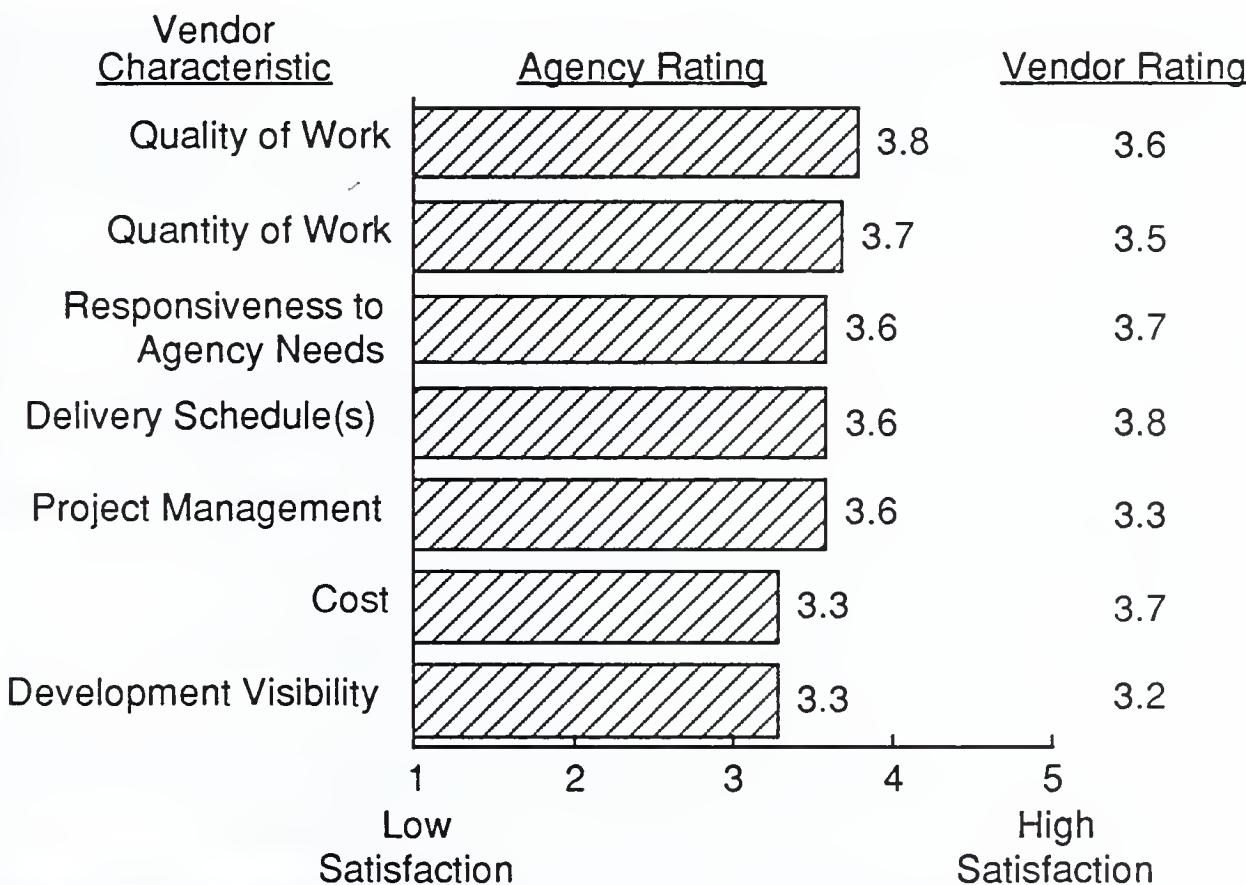
Agencies rated vendors highest on quality of work, although vendors themselves gave the highest rating to delivery schedule. However, the differences were so slight as to be insignificant. The quantity of work done by vendors received the second highest rating by the agency respondents. Agencies were somewhat less satisfied with the costs than vendors believe, suggesting a slight disconnect. The ratings for the other characteristics were similar between the agency and vendor scores.

Neither agencies nor vendors gave a high rating to project management, as currently performed by the vendors. This is an area where much improvement is needed, but few suggestions were offered on how to make these improvements.

8. Suggestions for Future Improvements to Services

Agency respondents were queried as to how vendors might make processing services and operational support services more valuable to the federal government over the next five years. As should be expected, the replies varied due to the different types and levels of experience that the respondents have had with vendors.

Exhibit IV-13 lists the principal suggestions made by the federal agencies. There is no consensus of opinion or frequency of mention. Improvements in the staff's technical knowledge and improved responsiveness to agencies' needs were both cited by many respondents. These improvements reflect the high support levels required by many agencies.

EXHIBIT IV-13

Agency Suggestions for Improvements to Vendor Services

- Improve knowledge of staff

- Improve responsiveness to agency needs

- Improve cost for services

- Improve development of facilities management tools

- Improve availability of corporate expertise

Note: No ranking due to diversity of responses.

As happens on so many types of federal contracts, vendors are caught in a squeeze and, to some extent, are being constrained by the procurement process. On the one hand, to win the business, vendors must offer low prices and extremely favorable terms to the government. This sometimes translates into low salaries and poor benefits, particularly among lower level vendor personnel. As a result, agencies deal with staff who lack the

knowledge and responsiveness to support their needs. Therefore, vendors need to find ways to finesse these competing forces: to win the business *and* satisfy the customer. More realistically, vendors need to make government procurement personnel more aware of the penalties associated with lowest bidder awards, the principal culprit.

These findings are also fairly consistent with the previous question on vendor performance characteristics. Agencies are again noting some dissatisfaction with the costs associated with processing services and systems operations. From their perspective, costs may be higher than they expected. However, part of that cost may result from unanticipated increases in workload.

In addition, responses were directed to improvements in the development of facilities management tools and improved availability of corporate expertise. Generally, agencies are concerned with keeping trained staff and a proper skill mix. It is sometimes felt that vendors do not produce the quality of staffing proposed, or if produced, many of the qualified personnel are transferred shortly after the contract starts.

A recent protest was sustained against Planning Research Corporation (PRC) because of nearly total staff changes after contract award. In this case, it was concluded that PRC never intended to provide the people listed in the proposal. This suggests another problem for vendors. They cannot afford to have people idle, waiting for a contract to be awarded. Everyone must be covered on billable work, to generate the overhead necessary to keep the business going. Furthermore, because vendors only win a portion of their bids, they usually bid the same people on multiple contracts. If they win more than expected (a delightful problem), they need to move quickly to fill in their staffing gaps.

Aside from the vendor-directed improvements, it was also noted that a better evaluation system was needed for use by the government in awarding processing services or systems operations contracts that would not always result in the lowest bidder winning. Furthermore, comments were received expressing the view that these services would be more valuable if federal hiring practices changed.

D

Acquisition Plans and Preferences

1. Acquisition Methods

Agency respondents were asked to indicate how they acquire processing services and systems operations services. The respondents gave multiple responses. As shown in Exhibit IV-14, more than 80% of the respondents stated they used RFPs for procuring processing services, while 58% used this method for acquiring systems operations. GSA's TSP program gives agencies greater flexibility in acquiring processing services.

EXHIBIT IV-14

Agency Methods for Acquiring Processing Services and Systems Operations

RFP for Specific Purchase — 83 / 58

GSA Schedules — 47 / 17

Mission-Oriented Contracts — 17 / 17

Part of Other Procurements — 17 / 17

Other Methods — 8 / 8

▨ Processing Services
▨ Systems Operations

Percent of Respondents
0   20   40   60   80   100
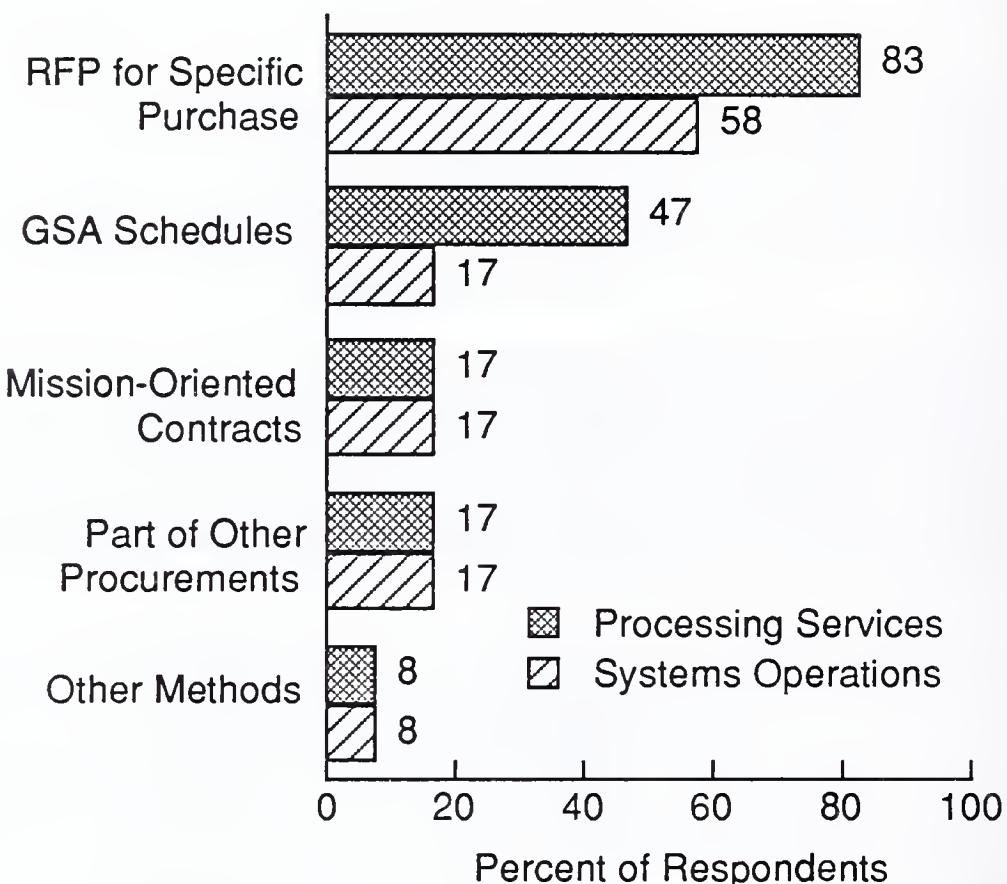
Note: Totals exceed 100% due to multiple responses.

The next highest percentage was 47% of the agency respondents specifying use of the GSA schedules for processing services. Only 17% of the respondents use the schedules for systems operations services. It is assumed that agency responses referred to GSA's Multiple Award Schedule Contracts. INPUT is not aware of any GSA schedules covering systems operations activities. The responses indicated too that only 17% of the respondents currently use mission-oriented contracts or include either processing services or systems operations as part of other procurements. The other methods cited include 8(a) set-aside type procurements. As indicated earlier, systems integration contracts are now including systems operations as an option.

The findings regarding agency methods of acquisitions suggest that for the most part, vendors must be party to a competitive bidding process. Teaming may become mandatory in some of these situations.

Agency respondents were also asked if they had any experience procuring remote computer services (RCSs) under the Teleprocessing Services Program —TSP. Forty-five percent of the respondents have used the TSP for acquisition of services. Respondents not using the program were asked to identify the reason for buying processing services outside of the TSP. Exhibit IV-15 ranks the most frequently mentioned reasons.

EXHIBIT IV-15

Agency Reasons for Buying Processing Services Outside the TSP Program

Reasons	Rank*
Use other government computer facilities	1
Agency has special applications	2
Use of proprietary data bases	2
Unknown	4

* Rank based on frequency of mention by respondents.

Agencies are going outside of the TSP primarily due to their use of other government computer facilities. An increase in government data center usage has already been noted at some agencies. The next two most frequent reasons relate to the uniqueness of the application or its proprietary nature, causing the agency to exclude the TSP as an alternative option. For example, the Treasury Department may need to access a special system for econometric modeling. Many of the respondents could not identify a reason. Furthermore, agency respondents were also reluctant to comment on how the MASC or BA might be improved. This lack of suggestions probably reflects GSA's efforts to improve the program.

2. Contract Type Preferences

The federal agencies surveyed indicated that their organizations have a variety of preferences in types of contracts for processing services and systems operations, as shown in Exhibit IV-16. This diversity includes a mixture of cost-plus, fixed-price, fixed-labor and price-hour contracts.

EXHIBIT IV-16

Agency Preferences for Type of Contract

Type of Service	Percentage of Respondents				
	Type of Contract				
	Cost-Plus	Fixed-Price	Fixed-Labor	Price-Hour	Mix/Other
Remote computer services	25	50	-	8	-
Value-added networks	17	25	-	-	-
PFM-COCO	8	17	-	-	8
PSFM-GOCO	33	17	-	-	8
On-site operations and maintenance software development responsibility	25	25	0	25	-
On-site operations and maintenance without software development responsibility	33	25	8	17	-

Many respondents recognize the inherent difficulties of pricing some large data processing projects by preferring "cost-plus" contracts in this area and reserving fixed-price contracts for situations where the requirements are well-defined and perhaps smaller. Fixed-price contracts are becoming more prevalent as agencies select mission-oriented contracts.

3. Vendor Selection Criteria

Agency ratings of important factors in the selection of processing services and systems operations vendors are shown in Exhibit IV-17. Initial cost topped the agency respondent's selection criteria and also appeared first in the ratings by vendors. In this case, everyone focused on the cost issue. The high rankings for proposed operating procedure and vendor reputation indicate that these criteria were also important factors in both the opinion of agencies and vendors. This is particularly true in systems operations contracts at agencies where the entire operation has been

given to the vendor. The extent of the cost control procedures implemented by the vendor was given the lowest rating by the agency respondents. This seems contradictory, in light of the high rating for initial cost. If costs are not controlled properly, the initial cost estimate will mean relatively little.

EXHIBIT IV-17

Agency Ranking of Vendor Selection Criteria

Selection Criteria	Agency Rank	Vendor Rank
Initial cost	1	1
Proposed operating procedures	2	3
Vendor reputation	3	2
Cost control procedures	4	4
Contract type	5	5

E

Projected Trends in Processing Services and Systems Operations

1. Increases/Decreases in Contracting

The agency respondents' views of the expected changes in contracting for processing services and systems operations are identified in Exhibit IV-18. The majority of the respondents do not anticipate any change from the current levels of contractor support services. This is somewhat inconsistent with the agency budget data and the forecast provided in Chapter III.

All respondents view the COCO market segment as stable, while nearly all (91%) expressed the same view for GOCO also. Roughly one-quarter of the respondents hold the opinion that remote computer services (RCSs) and on-site operations and maintenance will increase in the range of 15 to 30 percent over the next two to five years. Those agencies respondents indicating a decrease in RCSs estimated a decline of between 10 and 50 percent.

EXHIBIT IV-18

Agency Views on Expected Change in Contracting of Services

Type of Service	Percent of Respondents			Average Percent Change
	Increase	Decrease	No Change	
Remote computing services	25	25	50	28
Value-added networks	18	9	73	20
PFM—COCO	-	-	100	-
PSFM—GOCO	9	0	91	15
On-site operations and maintenance	27	9	64	22

The different views may reflect the varying perspectives of the respondents. Although they do not expect increases in the programs they manage, more programs are being contracted out. At any rate, the survey data tends to dampen growth prospects in some delivery modes.

Exhibit IV-19 lists the main factors that the respondents feel contribute to the expected increase or decrease in acquisitions of processing services or systems operations. The most frequently mentioned factor of increased LANs may have a future negative impact when applications are moved to these networks. However, it may also have the positive impact of increasing VAN services. The increased use of microcomputers and minicomputers contributes to a decrease in use of contracted services, because the more powerful computers allow for some operations to be transferred in-house.

Agencies with increasing workloads and increased missions that cannot increase in-house personnel resources will look to vendors to supply contracted processing services and systems operations so they can accomplish the work while scarce FTEs can be applied to other areas. Cost considerations will remain a key factor with agencies in making their

EXHIBIT IV-19

Factors Contributing to Expected Increase/Decrease in Acquisition of Services

Factor	Rank*
Increased use of LANs	1
Increased use of microcomputers and minicomputers	2
Increased agency workload/mission	3
Cost considerations	4
Developments of central on-line data bases	5

* Rank based on frequency of mention by agency respondents.

decisions to contract out. And, finally, the development of central on-line data bases may decrease some processing service needs, but increase contractor services to support these efforts. Most of these on-line data bases support mission-oriented applications at the agencies.

The government agencies surveyed by INPUT were also asked to reveal if their offices have moved or plan to move any applications from RCS to other forms of data processing. Fifty percent of the respondents have changed applications already, while 33% anticipate doing so in the future.

The main reasons for the switching of the application include:

- Cost
- Batch delays
- Ease of use/flexibility
- Increased in-house operations
- Change in requirements
- Security concerns

A wide range of applications have been switched for RCSs. Many were for mission support. In part, this change probably reflects the growing functionality of vendor offerings.

2. Transition/Conversion to In-House Support

When a systems operations or on-site operations and maintenance contract is completed, the government is faced with a choice—should the continued support be transferred in-house, or should that continued support be obtained from a vendor? Two-thirds of the agencies surveyed preferred to convert the program to contractors for continued support services. Only a few of the agencies questioned had no clear policy and made a decision based on the circumstances of the specific project.

As a follow-up to this question, the government agencies were asked to reveal any plans to convert systems operations contracts to in-house or to convert in-house support functions to outside contractor support. No agencies indicated any plans to convert any contracts to in-house. The reasons stated included being satisfied with the existing support contractors, staff ceilings, and costs.

Forty percent of the respondents noted that they plan to convert a current in-house operations and maintenance support function to an outside contractor. For these agencies, a lack of trained personnel, FTE constraints, and OMB A-76 directives are the contributing factors for their turning to contractor support.

3. Use of Federal Data Centers

Federal data centers became eligible vendors of processing services/ systems operations under the revised OMB Circular A-76. For example, NIH operates a rather large remote computing operation. Payments that pass directly between agencies for services provided by NIH and other government-owned computer centers are called interagency transfers.

Agency respondents were asked to indicate whether their agency/organization has increased or decreased its use of federal data processing centers. Exhibit IV-20 summarizes their responses.

The largest percent (46%) of the respondents noted that use of federal data processing centers has remained constant because there has been no change in resources and the same contracts are in effect. This response is consistent with other findings, which shows this workload to be fairly flat. Over one-third (36%) of the agencies stated that use has decreased primarily as a result of increased local PC use, shifting applications

EXHIBIT IV-20

Agency Use of Federal Data Processing Centers

Change	Percent of Respondents	Reasons
Increased	18	• Reduced cost • Increased mission workload • Increased automation
Decreased	36	• "Old" technology • Increased local PC usage • Shift applications in-house
Remained same	46	• No change in use of resources • Same contracts in effect • Historically remain same

in-house, and their view that data centers use old technology. Only 18% of respondents specified that their agency has increased use of the government-operated computer facilities. The increases stem from cost reduction efforts, increased mission workload, and increased automation.

4. Market Trends and Developments Affecting Federal Processing Services and Systems Operations

Agency respondents were queried as to how the following trends and developments affect, if at all, the federal market for processing services and systems operations.

a. Growth in End-User Computing

Most respondents noted a decrease in the overall market for processing services resulting from the change of operations to PCs and other forms of local processing. End-user computing also will reduce the use of time-share services. Furthermore, greater use of central data bases was mentioned as an impact.

b. Industry Consolidation

No agency respondents viewed any industry consolidations as having an impact on either federal market.

c. Federal Budgetary Constraints

The majority of respondents have experienced budgetary constraints, particularly regarding personnel. Budgetary constraints also have contributed to fragmentation of processing requirements and prevention of upgrades to enhance computer systems.

d. FTS 2000

Most of the respondents are not yet sure of the impact from implementation of the FTS 2000 program. However, from the comments noted, several respondents indicated increases in the federal operational support services. FTS 2000 also will increase local processing, thus impacting segments of the processing services market.

e. Heightened Computer Security Requirements

Respondents were evenly divided between security requirements having no impact on the processing services and systems operations markets and having a "significant" impact. No specifics of how the computer security requirements would influence these markets were noted by agency respondents.

5. Technological Trends Affecting Federal Processing Services and Systems Operations Markets

The growth of end-user computing, particularly microcomputers, is holding down the growth of the federal processing services contracts. When 486-based microcomputers become available in 1990, agencies will have even greater opportunities to downsize their applications, thus further eroding the business base for processing services.

There is little in the way of technology developments affecting systems operations. Maintenance costs are lower, since newer equipment is both more reliable and more modular. However, agencies will continue to need some outside maintenance support.
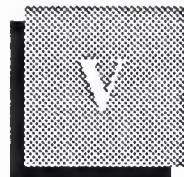
Competitive Trends

A
Vendor Participation

1. Vendor Products and Services

Vendors that compete in the processing services/systems operations market offer a wide range of products and services. Exhibit V-1 shows the products and services that vendor respondents currently provide to the federal agencies.

Currently, batch processing, remote computing services (RCSs), GOCO, and VANs are offered by the largest percentage of respondents. Several more vendors expect to offer these services in the future. Given the flat market for batch processing, INPUT recommends that vendors not pursue that market.

The vendors surveyed generally sold each of the categories of processing services and systems operations services in varying amounts. Not only does the companies' participation in these markets differ, but their breakout of company-estimated shares of revenues derived from each of the services also differs widely. Some companies are predominantly in one market segment or another, while other companies are active in two or more of the areas of services.

EXHIBIT V-1

Type of Services Provided by Respondents

Service	Current (1989)	Future (1990-1994)
Batch Processing	82	91
Remote Computing Services	64	73
Professional Services Facilities Management (GOCO)	64	73
Value-Added Networks (VANs)	64	55
Local Area Networks (LANs)	55	64
Processing Facilities Management (COCO)	55	55
On-Site Operation and Maintenance Services	55	55
Distributed Processing Services	27	45

Percent Offered (0 – 100)

Legend:
- Current Services, 1989
- Future Services, 1990-1994

2. Federal Agency Opportunities

The majority of the industry respondents provide their operational support services to both the DoD and civilian agencies. In response to the question of which agencies can be identified as the best opportunities for a given company in these markets, the major defense agencies and several large civilian agencies such as Treasury, GSA, and Energy were mentioned, as shown in Exhibit V-2.

EXHIBIT V-2

Vendor Perceptions of Best Agency Opportunities for Vendor Services

Defense Agencies	Civilian Agencies
Army	GSA
Navy	Treasury
Air Force	Energy
Marines	Labor
OSD	Agriculture
DCA	NASA
	Transportation

The DoD agencies are cited as opportunity areas because vendors noted that the DoD historically uses RCSs, has the largest budgets, and is expected to increase the contracts for systems operations. The civilian agencies mentioned also are actively contracting for processing services and systems operations. Many of the agencies use these services in response to limited available capital.

3. Applications Supported by Vendors in the Federal Processing Services Market

INPUT queried industry respondents about which applications their processing services support at federal agencies. As might be expected, agency data base and administrative applications were the most frequent replies. Payroll/personnel applications also were mentioned frequently. The applications supported by the vendors as listed in Exhibit V-3 are similar to those cited by the agency respondents. INPUT expects mission support to increase in importance over the next few years, as agencies take advantage of the increased functionality available in external data bases.

EXHIBIT V-3

Applications Supported by Processing Services Vendors

Application	Rank*
Agency data base	1
Administrative	2
Personnel/payroll	3
Mission support	4
Inventory	4
Finance	4

* Rank based on frequency of mention by respondents.

The vendors also were asked their opinion as to which three applications at agencies have suffered the greatest loss in the past year to alternative forms of data processing. The three most frequently mentioned applications were text processing, project management, and engineering. These applications are targets of downsizing to microcomputers or other smaller in-house computer systems, rather than processing services programs.

Some vendors see the traditional applications of mission support, personnel, administrative, and finance also being vulnerable to replacement by alternative forms of data processing over the next five years. Other vendors were not able to identify future trends in applications for processing services.

Furthermore, the impact of LANs on agency processing services and systems operations applications contracted to vendors was viewed as minimal by the industry respondents. The LAN-directed applications mentioned by vendors included administrative, project management, agency data bases, and financial. However, none of the applications were undergoing any cutbacks at present for contracted services.

4. Applications Supported by Vendors in Federal Systems Operations Market

Exhibit V-4 shows the main applications supported by industry vendors that supply systems operations to federal agencies. The majority of the vendors cited agency data base, mission support, financial, and administrative applications as areas in which they provide contract support services. The other applications listed are typical of the government's use of systems operations contractors. Agencies such as NASA and Energy continue to use these contractors in the areas of project management, engineering, and scientific applications to assist with large projects in which they lack in-house staff or expertise.

EXHIBIT V-4

Applications Supported by Systems Operations Vendors

Application	Percent of Respondents
Agency data base	64
Mission support	55
Finance	55
Administrative	55
Logistics	55
Inventory tracking	45
Project management	45
Personnel	45
Engineering	45
Scientific/statistical	45
Data base—proprietary	36
Text processing	36

As agency workloads increase in the future, vendors anticipate support-
ing similar applications. This trend is particularly true in the area of
mission support, where agencies will continue to look to the vendor
community for assistance.

B
Vendor Market Perceptions

1. Reasons Vendors Compete in Federal Processing Services/ Systems Operations Market

When asked specifically why their company decided to compete in the
federal processing services and/or systems operations market, most
industry respondents cited past experience and long-term involvement as
the top-ranked reasons, as seen in Exhibit V-5. What that suggests is that
some vendors stay in this market out of sheer inertia, which is not a
particularly good reason. Growth potential and diversified skills were
the next most frequently cited reasons to participate in these segments of
the federal information technology marketplace. These represent a
sounder approach. Again, as in other recent INPUT studies, the defense
prospects were not viewed as favorable by most respondents.

EXHIBIT V-5

Factors Influencing Decision to Compete in the Federal Processing Services/Systems Operations Market

Factor	Percent
Past Experience	91
Long-Term Involvement	91
Growth Potential	82
Have Diversified Skills	55
Profit	45
New Technology	27
Defense Prospects	27
Software Skills	18

Percent of Responses
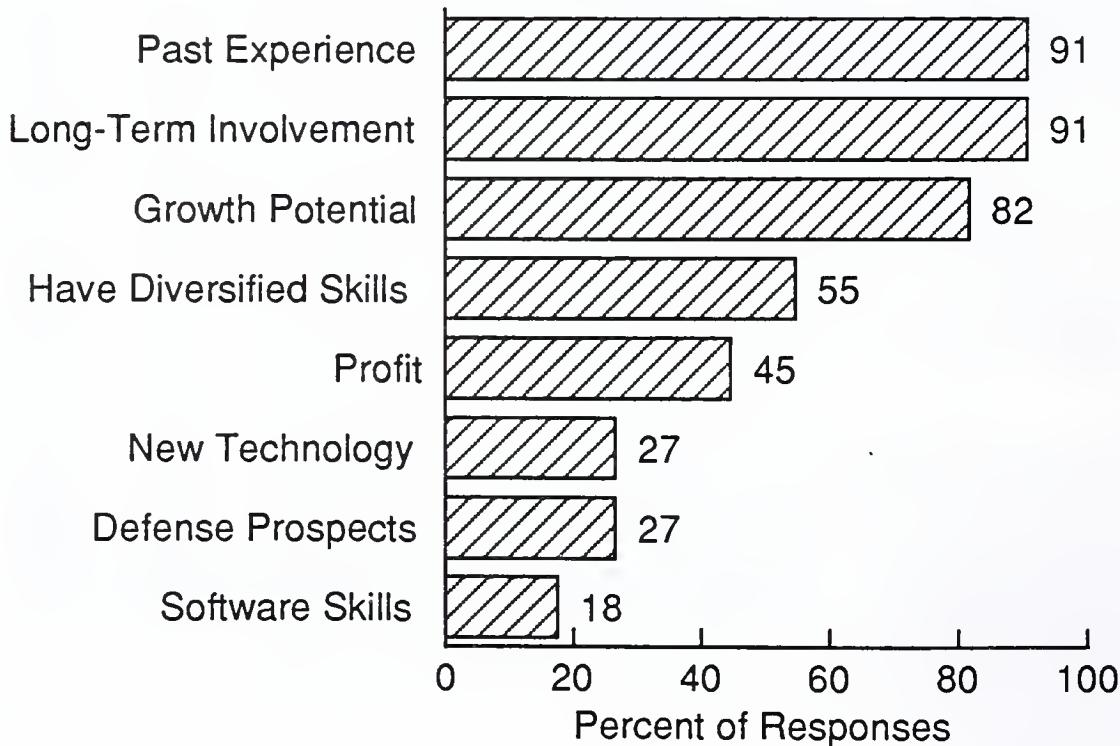
It is interesting to note that profit was mentioned by fewer than half the respondents as a motivator for participating in this market. In most business enterprises, profit is the motivating force, the engine which allows the business to invest and grow. However, the responses suggest a recognition on the part of the vendors of the difficulties associated with federal business.

2. Advantages/Disadvantages of the Federal Processing Services Market

Vendors surveyed by INPUT had limited opinions on the advantages/ disadvantages of competing in the federal processing services market. Respondents' comments are identified in Exhibit V-6. Processing services has the advantages of extending client relationships, shared costs, and shared hardware/software. These advantages make the market appealing primarily to those vendors that would use it as a springboard to other activities.

EXHIBIT V-6

Advantages/Disadvantages of the Federal Processing Services Market

Advantages

• Extend client relationships

• Share costs

• Share hardware/software

Disadvantages

• Highly competitive

• Risky procurement process

• Little value added

The high level of competition represents a serious disadvantage that vendors face in the federal processing services arena. Some industry respondents were of the opinion that too many vendors have entered into this market. Also, it is now perceived as involving a risky procurement process. Furthermore, industry vendors noted that there is little value added by vendors, thus restricting potential profits. Where vendors can dominate a niche market, e.g., EDI, profit potential increases.

3. Advantages/Disadvantages of the Federal Systems Operations Market

Vendors' views of the advantages/disadvantages in the systems operations market are shown in Exhibit V-7. They are not ranked due to the diversity of comments.

EXHIBIT V-7

Advantages/Disadvantages of the Federal Systems Operations Market

Advantages

- Flexible staff levels

- Fixed costs

- Shared technology

- Diversified experiences

Disadvantages

- Highly competitive

- Forced low-bid position

- Determination of requirements

- Lack of loyalty by agencies

Vendors noted that this market offered them the advantages of flexible staffing levels and fixed costs. Both of these add to profitability in this market segment. Also cited was the shared technology, thus eliminating any developmental expenses. Lastly, many vendors expressed their belief that systems operations are beneficial in offering companies diversified experiences. These contracts generate the internal qualifications that vendors can use in competing for additional work.

The key disadvantage of systems operations is the fact that the market is becoming highly competitive. In addition, vendors expressed their frustration in being forced to bid the lowest price and then experiencing difficulties in determining agency requirements. Furthermore, some vendors mentioned a lack of loyalty by agencies to incumbent contractors.

INPUT believes that the lowest price/agency requirements dilemma can be managed to the vendor's advantage. If pricing is based on requirements levels, the vendor may be able to recover costs if the workload increases substantially beyond government expectations. The vendor can foster this latent demand by providing good customer service and performing internal marketing.

4. Factors Determining Use of Processing Services or Systems Operations

Industry respondents were queried as to what factors determine a government agency's use of processing services or systems operations. The reasons most frequently mentioned by the respondents are shown together for comparison in Exhibit V-8.

EXHIBIT V-8

Reasons Agencies Use Processing Services and Systems Operations

Reasons for Use of Processing Services	Rank*	Reasons for Use of Systems Operations
Cost considerations	1	Cost considerations
Lack available agency staff	2	Lack available agency staff
Lack hardware/software technology	3	In-place hardware/software
Shorten implementation time	4	Satisfy agency mission
Lack capacity	5	Satisfy agency requirements

* Rank based on frequency of mention by industry respondents.

The most frequently cited factors contributing to use of either type of service are cost considerations and lack of available agency staff. These two factors were also mentioned by the agency respondents.

The lack of hardware and software technology at some agencies contributes to the use of processing services. Having the existing technology in place allows agencies to use GOCO or other systems operations services. These services also tend to assist agencies in accomplishing their agency mission. In some cases agencies look to outside vendors with special expertise because the agency's data processing requirement is unique and would not readily adapt to existing or usual processes or configurations.

Industry respondents also indicated that processing services are used to shorten the implementation time needed with large processing projects, thus allowing the agency to accomplish its tasks expeditiously. Furthermore, vendors' experiences have indicated that many agencies lack the capacity on their own computer systems to satisfy a wide range of data processing requirements in technical, administrative, and' programmatic applications. Processing services, in particular, provide short-term expansion capacity to agencies without requiring a major capital investment.

5. Expected Increases/Decreases in Contracting

The vendor's views of the expected changes in contracting for processing services and systems operations are identified in Exhibit V-9. Some vendors expect increases from current levels of contractor support for most services.

EXHIBIT V-9

Vendors' Views on Expected Change in Contracting of Services

Type of Service	Percent of Respondents			Average Percent Change
	Increase	Decrease	No Change	
PSFM—GOCO	55	-	45	13
Value-added networks	50	37	13	13
On-site operations and maintenance	45	-	55	10
Remote computing services	40	50	10	13
PFM—COCO	23	-	77	10

Fifty-five percent of the respondents were of the opinion that GOCO services would increase in the range of 10% to 15% over the next two to five years. This compares favorably with INPUT's forecast of 15% for this market segment. Most vendors are, in fact, quite pessimistic about growth prospects in this market.

For the on-site support operations market, the industry respondents are closely divided in their expectations. Forty-five percent expect an increase, while 55% see no change over the next few years. The majority of industry respondents (77%) view the COCO market as stable. However, as discussed in Chapter III, INPUT expects this market to grow 17% annually over the next five years. Again, the vendors showed more pessimism in their views than appears to be justified by current market conditions.

Exhibit V-10 lists the main factors that the industry respondents feel contributes to the expected increase or decrease in contracting for processing services or systems operations. The most frequently mentioned factor that will spur industry growth is the government's limited resources.

EXHIBIT V-10

Factors Contributing to Expected Change in Acquisition of Services

Factor	Rank*
Limited resources of government agencies	1
Cost considerations	2
Lack of skilled agency staff	3
Technology	4
FTS 2000	5
Increase in contracting out	5

* Rank based on frequency of mention by respondents.

Agencies with increased workloads and missions that do not have sufficient in-house resources will look to vendors to supply contracted processing and systems operations in order to accomplish their tasks. Cost considerations also will remain a key factor with agencies in making their decisions to contract out, especially in light of tighter budgets and closer scrutiny of costs.

Although technological developments may decrease some processing service areas, they may increase other contractor services to support these modernization efforts. The effects of FTS 2000 are still not fully visible, but the vendors cited the program as potentially decreasing vendor-supplied processing services to many agencies.

6. Satisfaction Level

Vendors were asked their opinion of the level of satisfaction of government agencies with the performance of industry contractors that supply processing services and systems operation. The results are presented in Exhibit V-11. The agency ratings are shown for comparison.

As shown in Exhibit V-11, vendor respondents expected that they would be rated highest on their delivery schedule(s), yet this was only third highest in the minds of agency respondents. Responsiveness to agency needs and cost were tied for second in ratings given by the vendors, but also received lower satisfaction ratings from the agencies. This slight difference in ratings suggests that vendors are communicating fairly well with their customers.

Quality and quantity of work were viewed by vendors as being of nearly equal value and in the midrange of the ratings. However, the agencies rated vendor work quality first. This difference may stem from the vendors not viewing their own work as objectively as the contracting agencies do.

Project management was near the lower range of satisfaction from the viewpoint of the vendors and among the higher ranking for agencies. In some instances, this is one characteristic that agencies use as a visible measure of the vendor's skill level.

EXHIBIT V-11

Agency Satisfaction with Vendors—
Vendor Viewpoint

Characteristic	Vendor Rating	Agency Rating
Delivery Schedule(s)	3.8	3.6
Responsiveness to Agency Needs	3.7	3.6
Cost	3.7	3.3
Quality of Work	3.6	3.8
Quantity of Work	3.5	3.7
Project Management	3.3	3.6
Development Visibility	3.2	3.3

```
        1       2       3       4       5
       Low                            High
    Satisfaction                  Satisfaction
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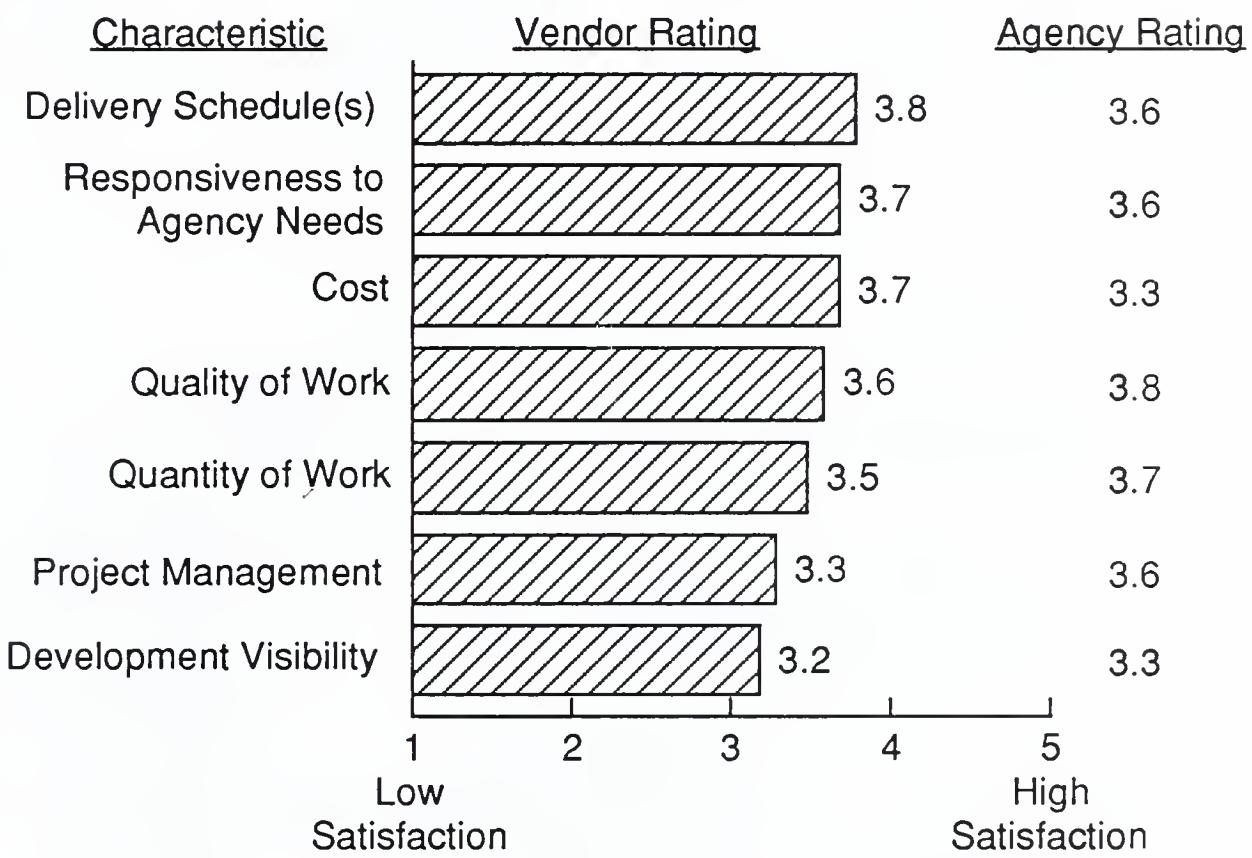
Ratings based on scale of 1 to 5; 5 = highest, 1 = lowest

C

Vendor Contracting Views

1. Importance of Vendor Characteristics for Contract Award

Vendor ratings for the relative importance of specific characteristics in the award of processing services and systems operations contracts are shown in Exhibit V-12. Price was given the highest rating by industry respondents. Staff experience and support capabilities tied for the highest ratings by agency respondents. This difference reflects the varying perspectives between the agency users and the cost competitiveness of the vendors. Unfortunately, low cost usually implies low experience levels.

EXHIBIT V-12

Vendor Rating of Characteristics
for Contract Award

Characteristic	Vendor Rating
Price	4.6
Agency experience	4.1
Staff experience	4.0
Computer reliability	3.9
Application functional experience	3.7
Software development experience	3.7
Federal contract experience	3.6
Incumbent contractor	3.6
Support	3.5
Hardware experience	3.5
Training capabilities	3.1
Documentation	2.8

Ratings based on scale of 1 to 5; 5 = most important, 1 = least important

Agency experience and staff experience were also viewed as important characteristics by vendors. Vendors feel that they need to have agency processing and management expertise related to applications run by the agencies as well as knowledgeable staff. Also, vendors need to supply computer reliability because agencies are looking to vendors to maintain computer operations.

Vendors rated most of the other factors at a lower level of importance than did agency respondents. The extent to which vendors have training capabilities and are providing documentation were given the lowest ratings by vendor respondents. This is likely to result from the vendors taking the viewpoint that the agencies have turned over the programs to the vendor's staff and therefore have less need for training and documentation.

V-14

2. Vendor Experience with Acquisition Process

Exhibit V-13 identifies the procurement methods that vendors respond to in marketing their products and services to the federal government. The majority (64%) of the respondents use the GSA Schedule for federal marketing of processing services. The GSA Schedule is not appropriate for most systems operations services, as demonstrated by only nine percent of the respondents indicating use for these types of services. As pointed out in Chapter IV, INPUT is not aware of any GSA schedules that cover systems operations contracts.

EXHIBIT V-13

Vendor Experience with Acquisition Process

Procurement Method	Processing Services	Systems Operations
GSA Schedules	64	9
RFP for Specific Purchase	55	55
Mission-Oriented Contracts	18	55
Part of Other Procurement	27	27

Percent of Respondents
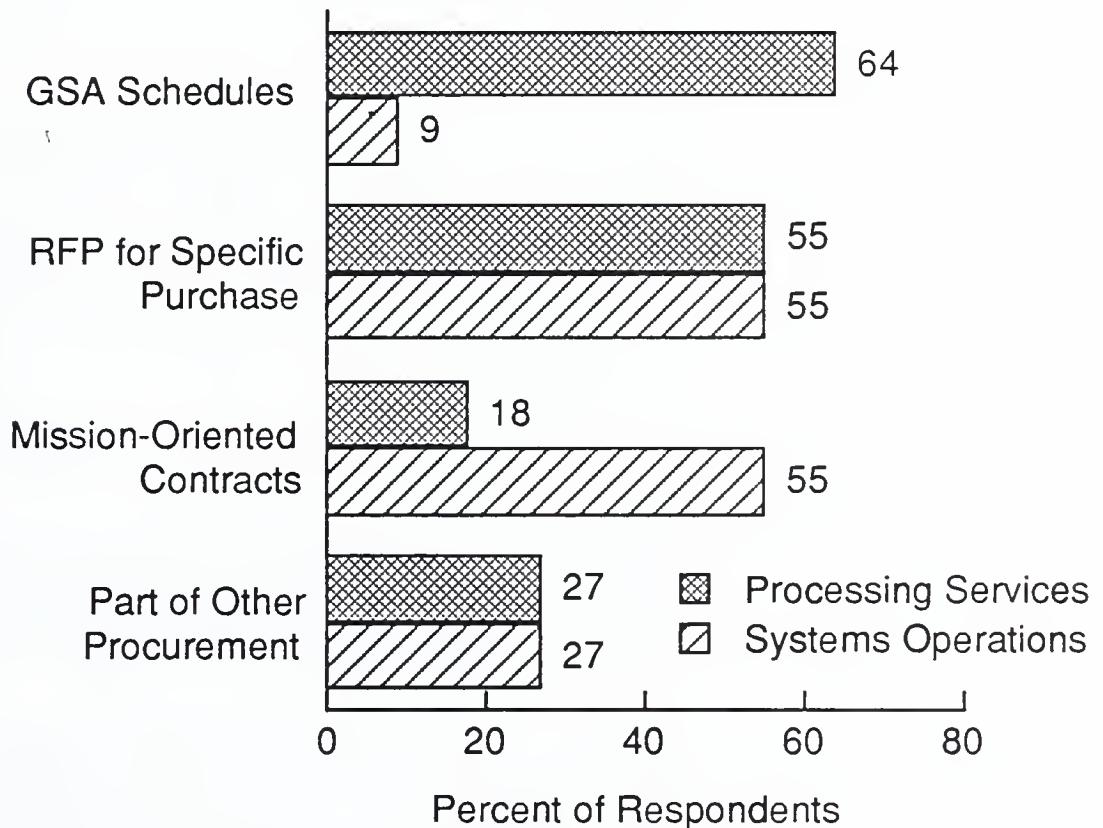
Note: Totals exceed 100% due to multiple responses.

The same percentage of respondents (55% each), rely on RFPs for specific purchases by agencies of processing services and systems operations. Thus, vendors are subjected to a lengthy competitive procurement process in these cases.

Several large agencies are using mission-oriented contracts for specific systems operations projects and other services. Mission-oriented contracts are held by 55% of the industry respondents for systems operations services. Far fewer vendors (18%) have used mission-oriented contracts with respect to processing services.

Twenty-seven percent of respondents have either supplied processing services or systems operations as part of other procurements. For example, the Army Standard Information Management Systems (ASIMS, formerly VIABLE) includes virtually everything. Even the Nationwide Data Network for the U.S. Courts included systems operations.

Industry respondents were also asked if they had any experience providing remote computer services under the GSA Teleprocessing Services Program (TSP). Fifty-five percent of the respondents have used the TSP MASC for supplying these services to federal agencies.

Furthermore, vendors commented on how the MASC might be improved. The most frequent area of suggested improvement was for simplifying the billing procedures. In addition, several vendors noted that the MASC should be expanded to allow for more innovative and technically advanced products. Other suggested improvements were directed to the burdensome procedures and short response time for RFPs. It is entirely possibly that GSA will respond favorably to some of these recommendations.

3. Preferred Contract Vehicles

Vendors participating in the federal processing services and systems operations markets provide services under a variety of contract vehicles. As shown in Exhibit V-14, one contract method that is becoming more commonly used is the fixed-price contract.

More than half (55%) of the respondents prefer fixed-price contracts for remote computer services, while 36% prefer this contract type for value-added networks. Fixed-price contracts are more appropriately used in situations in which the requirements are well-defined. Fixed-price contracts are preferred to a lesser degree for GOCO, COCO, and on-site operations and maintenance services offered by vendors.

A total of 36% of the vendors prefer cost-plus contracts for GOCO or operations and maintenance services with software development. In the vendors' opinion, cost-plus contracts are the only practical way to procure services when technical requirements are subject to change or when the workload is not constant. Twenty-seven percent of the industry

EXHIBIT V-14

Vendor Preferences for Type of Contract

Type of Service	Percentage of Respondents				
	Type of Contract				
	Cost-Plus	Fixed-Price	Fixed-Labor	Price-Hour	Mix/Other
Remote computer services	18	55	-	27	-
PSFM-GOCO	36	9	9	-	9
Value-added networks	18	36	9	-	-
PFM-COCO	27	18	9	-	9
On-site operations & maintenance without software development responsibility	27	9	-	9	-
On-site operations & maintenance with software development responsibility	36	-	9	-	9

Note: Totals exceed 100% due to multiple responses.

respondents prefer cost-plus procurements for COCO services and on-site operations and maintenance without software development responsibility. This type of procurement would be preferable to fixed-price, because an agency's workload usually diverges substantially from expectations.

4. Vendor Selection Criteria

Industry-respondent ratings for the important factors in the selection of processing services and systems operations vendors are shown in Exhibit V-15. Initial cost topped the industry respondents' selection criteria and also appeared first in the ratings by agencies. All parties in these markets are aware of the emphasis on price as the marketplace becomes more competitive.

EXHIBIT V-15

Vendor Ranking of Services Contract Selection Criteria

Criteria	Rank
Initial cost	1
Vendor reputation	2
Proposed operating procedures	3
Cost control procedures	4
Contract type	5

The high ratings for vendor reputation and proposed operating procedures indicate that these criteria were also important to winning present and future awards. This is particularly true in systems operations contracts at agencies where the entire operation has been given to the vendor. The contract type was given the lowest rating by both the agency and industry respondents.

These findings suggest a typical conflict for the vendors to handle and ultimately overcome. They enhance their reputation by providing good quality people and good quality service. Unfortunately, this usually drives up the cost. In some contracts, it may be necessary to bid the project at cost (or even lower) in order to win it, and then depend on contract modifications for profit. The federal procurement process, with its emphasis on low price awards, often drives vendors to this strategy.

D
Trends

1. Teaming Patterns

Most current federal bids, at least major ones, require teaming. Vendors surveyed viewed their teaming relationship with other vendors as being moderately successful. Vendors rated their overall teaming success at 3.4 on a 1-to-5 scale, with 1 being least successful and 5 being most successful. These results suggest that some teaming relationships work well, while others do not.

Industry respondents were also asked whether their company's teaming efforts in the processing services and systems operations market changed over the past two years. Eighty percent of the respondents indicated an increase in teaming efforts. The remaining 20% were evenly divided between having no change or having no teaming experience at all. This reflects the change needed in teaming to meet growing complexity of government bids.

The types of vendors that the respondents usually team with in their federal processing services or systems operations contract are ranked in Exhibit V-16. Based on frequency of mention, most respondents cited having small business or 8(a) firms as teaming partners. This stems from the trend at federal agencies to set aside selected small contracts for award to minority-owned and small businesses. In many cases, large companies can serve as subcontractors on these teams.

EXHIBIT V-16

Vendor Preferences for Teaming Partners

Vendor Type	Rank*
Small business/8(a) firms	1
Hardware vendors	2
Professional services firms	3
Communications firms	4
Software manufacturers	5

* Rank based on frequency of mention by industry respondents.

Hardware and professional services firms also were cited often as potential teaming partners. The mix of equipment and staffing skills available between these two types of companies serves to satisfy many of the processing services and systems operations requirements of federal agencies. Furthermore, many of the hardware and professional services firms are already recognized leaders in the federal market.

Vendor suggestions on how to improve teaming relationships with other vendors are summarized in Exhibit V-17. The responses were too few to establish a ranking or priority.

EXHIBIT V-17

Vendor Suggestions for Improved Teaming Relationships

- Pricing flexibility
- Tighter control of project
- Better requirements definition
- Use of key staff
- Improved use of company resources

Note: Overall teaming success rating: 3.4 based on a 1 to 5 scale (1 = not successful, 5 = extremely successful)

The industry recognizes the need for more cooperation and flexibility in establishing prices among teaming partners. This in turn would increase the teams' chances of submitting a more cost-competitive bid. Respondents also see the need for tighter control of projects. This suggested improvement denotes vendor dissatisfaction with previous project management and supervision of some company's efforts and is consistent with the 3.4 rating on past teaming efforts.

In addition, the vendors noted their shortcomings in identifying the requirements of a program. Better and earlier identification of requirements would aid in developing stronger and more suitable teaming of companies and improved responsiveness to agencies needs.

In their suggestions, vendor respondents mentioned the need to improve the utilization of key staff and other company resources. Allocation of additional staff expertise and resources needed to improve operations would benefit companies' reputations in the long term and earn them more credibility with agencies. As always, however, the conflict over cost versus quality needs to be overcome.

2. Impact of OMB Circular A-76

OMB Circular A-76 is intended to reinforce the government's policy of not competing with the private sector. It claims to support the principle of relying on the private sector to provide available goods and services competitively, after completion of a cost comparison. Federal agencies are asked to attempt to achieve an economical and productive use of resources under the A-76 policy.

Industry became more concerned about the A-76 program and its ramifications when OMB Circular A-76 was converted from the Performance of Commercial Activities program to the Productivity Improvement Program under the past administration's Reform 88 efforts. At that time, federal data centers and government-operated ADP facilities were allowed to compete directly with industry for the available market dollars.

INPUT attempted to evaluate vendors' opinions on the current impact of OMB A-76 on the federal government's contracting for processing services and systems operations. The industry respondents disclosed only a few limited comments. Included were the opinions by some vendors that there has not been any, or only minimal, impact from A-76 policies. Other vendors saw more favorable impacts of A-76, such as expanding the market size and the tendency to retain contractors at agencies.

Vendors also were asked to estimate what percent of the federal government's COCO and GOCO service contracts have been implemented following an OMB A-76 review. The majority of the vendors estimated that between 10% and 25% of these contracts come about as a result of agencies conducting a cost comparison review. The DoD is the most active in undertaking reviews. However, for a variety of reasons, all the federal agencies are not fully achieving their established goals for yearly reviews.

3. Budgetary Impacts

Congressional attempts to reduce the overall deficit could result in delays in upgrading outdated computer systems, with corresponding increases in labor and maintenance at existing facilities, including vendor-owned centers and other systems operation services. Budget reduction measures also could result in a reduction of manpower ceilings in many agencies and increased funding of contract vendors for on-site operations and maintenance of agency facilities.

Industry respondents expressed varying opinions as to the effects of federal budget constraints on the processing services and systems operations markets. The comments denoting a favorable impact included an increase in systems operations and use of processing services, as well as

an overall positive impact. Vendors that were more conscious of the potentially negative impact mentioned that there would be closer scrutiny of costs, increased in-house programs, and flat growth in the market.

4. Impact of Industry Consolidation

Vendors were asked to identify the impact of industry consolidations on the market for processing services and systems operations in the federal government. Most vendors identified increased competition as the major notable influence. Along with increased competition, respondents commented on having experienced more aggressive bidding by companies and increased teaming efforts.

Other industry respondents expressed opinions that there are fewer opportunities for service firms, while participation by large aerospace firms has increased competition in the market. Some vendors did not view the industry consolidation as having any impact at all on the federal processing services and systems operations market.

5. Impact of Growth in End-User Computing

Industry respondents gave limited comments as to the impact of the growth of end-user computing on the processing services and systems operations markets. Their opinions include both positive and negative impacts. With regards to processing services, vendors anticipate a decrease in midrange service bureaus. However, it was also mentioned that processing service users are becoming more educated and make better use of these services.

In addition, industry respondents foresee optical disk technology and end-user computing as affecting the market for processing services and systems operations. Other vendors expressed their views that there will be little impact from increased end-user computing because large mainframe centers will still be required for many operations.

The majority of the respondents viewed the growth of end-user computing as having a more negative impact on the systems operations market than on processing services. According to their responses, vendors believe that fewer operations and applications are being contracted for by agencies. The increased use of workstations and networking of computer systems also adds to the declining use of systems operations, as per the opinion of some vendors. However, other vendors did see an increased need for support in this changing environment.

6. Impact of FTS 2000

The majority of the vendors surveyed remain uncertain as to the impact of the FTS 2000 program and therefore had a minimum of opinions as to its impact on the processing services and operational support markets. The opinions given varied widely, but included:

- No impact yet
- Reduced market for VANs
- Minimal effect on processing services
- Delays caused while programs are reviewed

As the agencies themselves continue to evaluate the role of FTS 2000 in pending and future procurements, the more apparent effects of FTS 2000 will become visible. Meanwhile, vendors that provide data and network services and support are put in the position of pursuing opportunities that eventually may be tied into the FTS 2000 system. The previously mentioned initiative at the U.S. Courts provides a typical example.

7. Impact of Computer Security Requirements

Recently enacted computer security legislation and regulations will have an impact on the processing services and systems operations markets. According to the vendors surveyed, the federal agencies' heightened computer security requirements translates negatively into more in-house systems, limited vendor opportunities, and less acquisitions of processing services, all due to security restrictions. The favorable aspects of computer security measures being implemented include more systems operations opportunities for the secure systems, more emphasis on a product's security capabilities, and increased demand for secure network products.

E
Recommendations

1. Suggested Improvements to Vendor Services

The industry respondents were asked to comment on what vendors need to do to make processing services and systems operations services more valuable to the federal government. The replies varied due to the different types and levels of experience the vendors have had with the federal agencies. The suggestions appear in four areas: technology, cost, project management, and staffing allocations.

A suggested improvement in technology is the use of optical disk technology. This would provide agencies with more flexible approaches to storage requirements and thus improve mission support. Vendors also noted that it might be advisable to provide a total solution, as was done in the VIABLE program (now ASIMS).

Industry respondents were mindful of the need to decrease the costs associated with processing services and systems operations. Though it was suggested that costs be reduced, few ideas were offered on ways to do it. Another issue surrounding costs was that further explanations of the cost/benefit analysis should be given. These findings for cost-related suggestions are fairly consistent with the agency respondents' dissatisfaction with costs.

Vendors are aware of the need to improve their project management skills. The suggestions of closer contract monitoring and improved management of vendor staff would make projects more successful and efficient in satisfying agency needs.

Responses also were directed to improvements in staff retention and stability of the work force. Vendors are continually examining the problem of being able to keep qualified personnel at one project for the duration of the contract. Federal agencies also are concerned with the retention of trained staff as well as a proper skill mix in order to successfully complete a program.

2. Recommendations

Vendors in the federal processing services and systems operations market are faced with increased competition. The market has become more cost competitive, and companies need to develop strategies to provide high-quality services but at lower cost to agencies. These goals can be achieved partly through the application of technology to reduce labor costs and partly through contract growth which is spurred by high-quality service.

Vendors also must face increased scrutiny of their business and ethical conduct during procurements as a result of the Procurement Integrity Act. This legislation, enacted in 1989, focuses on keeping procurements free of unauthorized influences. The agencies have reacted to the legislation by becoming more restrictive in disclosing information on pending and future procurements, thus making marketing to the government more difficult. Therefore, vendors need to develop other legitimate sources of acquiring information on procurements.

The strong suggestions made by both agency and vendor respondents regarding improvements in project management and staff retention reflect a growing area of concern, which if not addressed could hinder future contracts for processing services and systems operations. Not all retention steps cost money, but overall, the potential exists to drive up costs. However, high attrition can drive costs even higher while decreasing the quality of service. Given the labor-intensive nature of this work,

vendors need to make every effort to retain their employees and establish career tracks in which these employees can grow. Federal agencies rely on contractors for quality services, controlled processes, and expertise not available in-house. Vendors that do not fall short of their responsibilities will likely grow and prosper in the federal market.

VI
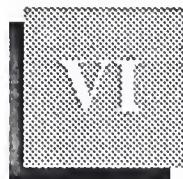
Key Opportunities

This chapter describes specific opportunities in the federal processing services and system operations market. Following the initial discussion of program funding and identification, a list of typical major programs for key agencies is provided. Some programs are listed because they include ongoing processing services needs that can be met by the vendors or they represent related agency processing support contracts.

The list covers the period FY 1990 to FY 1994. Other new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of this report and INPUT's Procurement Analysis Reports will include new programs and detailed program information for the FY 1990-FY 1994 time frame.

A
Present and Future Programs

Funding for federal processing services and systems operations appear in several budget categories of federal government agencies.

- Requirements for processing services for ADP may be separately identified but are included in the funding for overall information systems program procurements.

- Funding for processing services is reported as commercial services or as interagency payments when such services are provided by another agency.

- Systems operation programs may appear as a separate program or as part of other agency projects, including systems integration programs.

Significant processing services and systems operation programs that are larger than $1 million per year are listed in at least one of the following federal government documents:

VI-2

- OMB/GSA Five-Year Plan, which is developed under the Paperwork Reduction Act for agency budget requests submitted in compliance with OMB Circular A-11, Section 43A/B

- Agency long-range information resource plans developed to meet the reporting requirements of the.Paperwork Reduction Act of 1980

- Agency annual operating budget requests submitted to both congressional authorization and appropriations committees based on the OMB A-11 information

- *Commerce Business Daily* for specific agency opportunities and qualification as a bidder and to obtain a copy of an RFP or RFQ

- GSA Teleprocessing Services Program opportunity list

For the opportunities listed by agency in the following section, all funding proposals are based on cost data of the year submitted, with inflation dictated by the administration as part of its fiscal policy. They are subject to revision, reduction, or are spread to future years in response to congressional direction. Some additional reductions may be likely in FY 1990 and beyond due to the deficit reduction constraints of the Gramm-Rudman-Hollings Act and other budgetary constraints.

B
Processing Services/ Systems Operations Opportunities by Agency

1. Defense Agencies

Agency	Program	PAR Reference	RFP Estimated Schedule	Estimated Funding FY 1990-FY 1994 ($ Million)
Air Force	Command Budget Automated System (CBAS)	V-1-21	N/A	N/A
Air Force	Data Services Contract for AFAL	V-1-22	1Q/FY 1991	10.4
Air Force	Systems Engineering Support for NORAD Computer System	V-1-30	N/A	N/A
Air Force	Air Force Supercomputer Environment	V-1-118	N/A	N/A
Army	Comprehensive Army Research Institute Systems	V-2-23	2Q/FY 1990	N/A
Navy	DPSCWEST Computer Center Facilities Contract (Recompetition)	V-3-56	FY 1991	N/A
Navy	ADPE Time (ICP Back-up)	V-3-65	N/A	N/A
DoD	Defense Enrollment Eligibility Reporting System (DEERS)	V-4E-2	1Q/FY 1991	N/A

2. Civilian Agencies

Agency	Program	PAR Reference	RFP Estimated Schedule	Estimated Funding FY 1990-FY 1994 ($ Million)
Commerce/Patent and Trademark Office	Database Automation	VI-6-27	N/A	N/A
Interior/ U.S. Geological Survey	EROS (Earth Resources Observation System) Data Center	VII-9-17	3Q/FY 1991	N/A
Labor	Department Contract for Host Computer Services—Recompetition	VII-9A-9	3Q/FY 1990	7.2
Labor/Bureau of Labor Statistics	Bureau of Labor Statistics Contract for Host Computer Services— Recompetition	VII-9A-10	1Q/FY 1993	16.3
Transportation	ADP Support Services Contract	VII-11-30	January 1992	201.1
Transportation	National Driver Register (NDR)	VII-11-33	N/A	27.9
Treasury/Internal Revenue Service	Budget Preparation System— Recompetition	VII-12-16	N/A	N/A
Treasury/ Customs	Treasury Enforcement Communications System (TECS II)	VII-12-56	4Q/FY 1990	144.7
Education	Stafford/ Perkins Data Services	VII-13-8	N/A	47.1
General Services Administration	Multiple Award Schedule Program (MASP)	VIII-14-3	N/A	320.3

Agency	Program	PAR Reference	RFP Estimated Schedule	Estimated Funding FY 1990-FY 1994 ($ Million)
General Services Administration	PBS Task Order Support	VIII-14-11	N/A	N/A
NASA/Ames Research Center	Operations Central Computer Facility	VIII-15-12	1Q/FY 1991	5.0
Environmental Protection Agency	Facilities Management Primary Support Contract for NCC	VIII-17-7	October 1991	N/A

VI-6
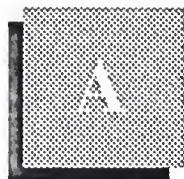
Appendix: Processing Services/ Systems Operations Interview Profiles

A

Federal Agency Respondent Profile

Contacts with agencies were made both by mail and telephone. The following agencies were interviewed:

Department of Agriculture

- Survey Reporting Division
- National Agriculture Statistics Service

Department of the Army

Department of Commerce

Department of Energy

Energy Information Administration

Environmental Protection Agency

Department of Interior

- Bureau of Mines

Department of Labor

- Bureau of Labor Statistics

Department of Transportation

Department of Veterans Affairs

Interviews included program managers and agency policy officials.

B

Vendor Respondent Profile

For the 1989 study, INPUT contacted a representative sample of contractors that provide processing services and systems operations to the federal government.

Job classifications among individual vendor respondents included marketing as well as administrative executives.

Interviews with vendor personnel were conducted by telephone and by mail.

B
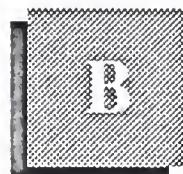
Appendix: Definitions

The definitions in this appendix include hardware, software, services, and telecommunications categories to accommodate the range of information systems and services programs described in this report.

Alternate service mode terminology employed by the federal government in its procurement process is defined along with INPUT's regular terms of reference, as shown in Exhibit B-1.

The federal government's unique nontechnical terminology that is associated with applications, documentation, budgets, authorization, and the procurement/acquisition process is included in Appendix C, Glossary of Acronyms.

A

Delivery Modes

Processing services - This category includes transaction processing, utility processing, other processing services, and processing facilities management.

- *Transaction Processing Services* - Updates client-owned data files by entry of specific business activity, such as sales order, inventory receipt, cash disbursement, etc. Transactions may be entered in one of three modes.

  - *Interactive* - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program files. Computer response is usually measured in seconds or fractions of a second.

  - *Remote Batch* - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.

EXHIBIT B-1

FEDERAL INFORMATION SYSTEMS AND SERVICES PROGRAM
INFORMATION SERVICES INDUSTRY STRUCTURE
1989
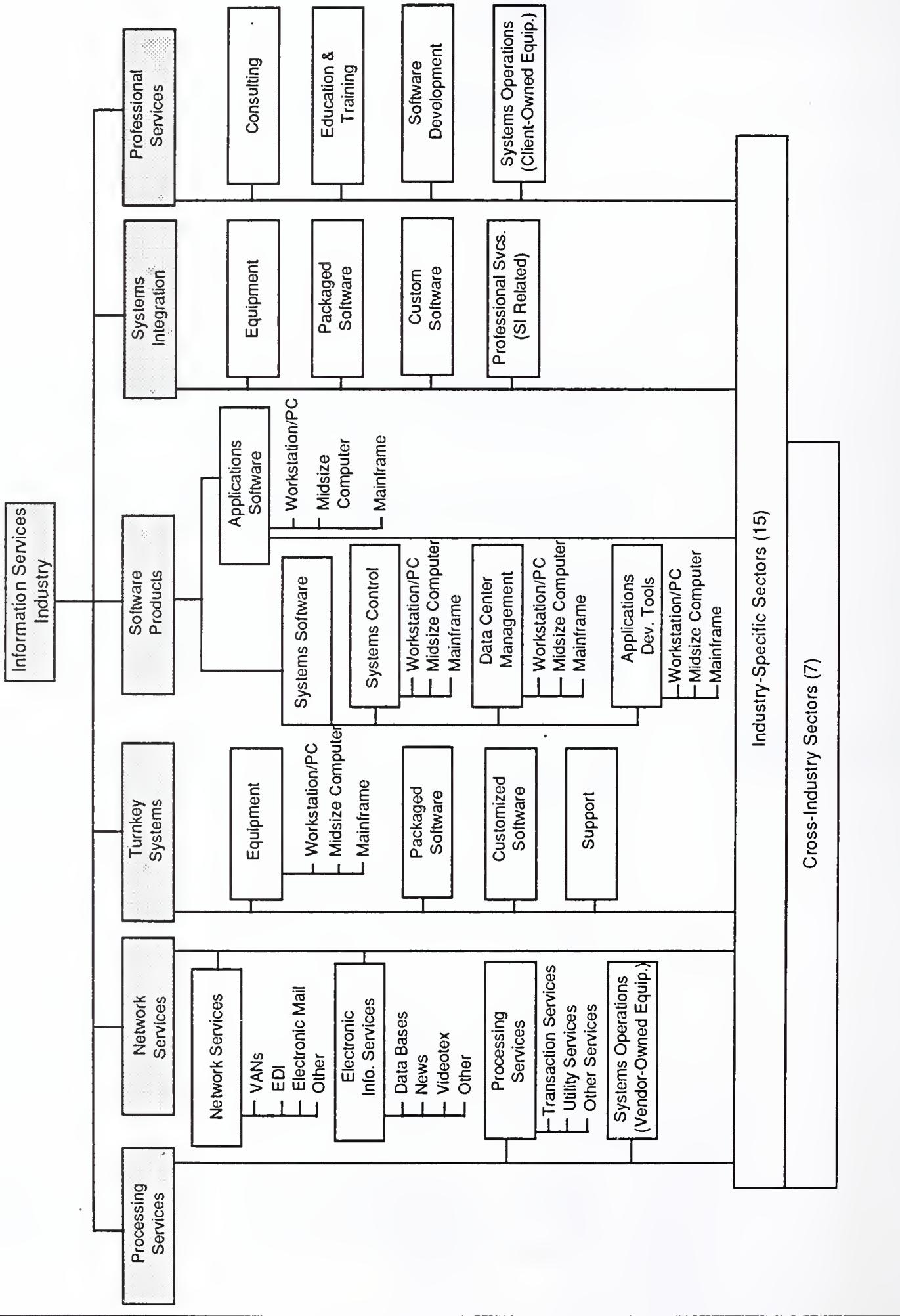
- *User Site Hardware Services (USHS)* - Those offerings provided by processing services vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:

  ° Access to a communications network

  ° Access through the network to the RCS vendor's larger computers

  ° Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network .

  ° Significant software as part of the service

- *Utility Processing* - Vendor provides access to basic software tools enabling the users to develop their own problem solutions such as language compilers assemblers, DBMS, sorts scientific library routines, and other systems software.

"Other" Processing Services include:

- *Batch Services* - These include data processing at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing. Other services also includes disaster recovery and backup services.

- *Systems Operations (Processing)* - Also referred to as "Resource Management," Facilities Management or "COCO" (contractor-owned, contractor-operated). Systems control is the management of all or part of a user's data processing functions under a long-term contract of not less than one year. This would include remote computing and batch services. To qualify, the contractor must directly plan, control, operate, and own the facility provided to the user–either on-site, through communications lines, or in a mixed mode.

Processing services are further differentiated as follows:

- *Cross-industry* services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general-ledger, accounts receivable, payroll, and personnel applications fall into this category.

Cross-industry data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).

- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry-specific applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.

Network Services include a wide variety of network-based functions and operations. The common thread is that more of these functions could be performed without network involvement. Network services is divided into two segments: value-added networks (enhanced services), and network applications (electronic information systems).

• *Value-Added Networks (VANs)* - VANs typically involve common carrier network transmission facilities that are augmented with computerized switches. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching techniques. However, other added data service features such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing are of equal importance.

• *Network applications* include electronic data interchange (EDI), the application-to-application electronic communications between organizations, based on established business document standards and electronic mail.

Software products - This category includes user purchases of applications and systems software packages for in-house computer systems. Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself. There are several subcategories of software products, as indicated below and shown in detail in Exhibit B-2.

B-4

EXHIBIT B-2

SOFTWARE PRODUCTS

Systems Software

Systems Control

- Access Control
- Communications Monitors
- Encryption Systems
- Operating Systems
- Point-to-Point Control
- System Library Control
- Other

Data Center Management

- Capacity Management
- Computer Operations Scheduling
- Data Center Management
- Downtime/Repair Monitoring Management
- Job Accounting
- Performance Monitors
- Tape Management
- Utilities
- Other

Data Base Management Systems

- Data Base Management Systems
- Data Dictionaries
- Other

Applications Development

Program Development and Production Tools

- Application Generators
- Assemblers
- Automatic Documentation
- Compilers
- Debugging Aids
- Languages
- Project Control and Management Systems
- Retrieval Systems
- Spreadsheet Systems
- Translators
- Others

EXHIBIT B-2 (Cont.)

SOFTWARE PRODUCTS (Cont.)

Applications Software

Cross Industry

Accounting
- Accounts Payable
- Accounts Receivable
- Fixed Assets
- General Ledger
- Purchasing
- Other

Human Resources
- Benefits
- Payroll
- Personnel
- Training and Education
- Other

Information Analysis
- Budgeting
- Decision Support Systems
- Financial Planning
- Forecasting
- Modeling
- Other

Logistics Distribution
- Distribution Accounting
- Inventory
- Invoicing/Billing
- Mailing List
- Order Entry
- Procurement
- Other

Word Processing
- Document Generators
- Text Editors
- Word Processing
- Others

Graphics
- Character Graphics
- Line Graphics
- Picture Graphics
- Others

Other
- Administrative Services
- Executive Services
- Operations Services
- Project Control and Planning
- Scientific Engineering and Technical Support
- Other

Industry-Specific
- Education
- Federal Government
- Insurance
- Medical
- Process Manufacturing
- Services
- State and Local Government
- Transportation
- Utilities
- Other

B-6

- *Applications Products* - Software that performs functions directly related to solving user's business or organizational need. The products can be:

  - *Cross-Industry Products* - Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.

  - *Industry-Specific Products* - Used in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, and material resource planning.

- *Systems Software Products* - Software that enables the computer/ communications system to perform basic functions. These products include:

  - *System Control Products* - Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, spoolers, network control, library control, windowing, access control.

  - *Data Center Management Products* - Used by operations personnel to manage the computer systems resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, utilities, capacity management.

  - *Applications Development Products* - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include traditional programming languages, 4GLs, sorts, productivity aids, assemblers, compilers, data dictionaries, data base management systems, report writers, project control, and CASE systems.

Professional Services - This category includes consulting, education and training, software development, and systems operations as defined below.

- *Software development* - Develops a software system on a custom basis. It includes one or more of the following: user requirements definition, system design, contract programming, documentation, and software maintenance.

- *Education and Training* - Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.

- *Consulting Services* - Information systems and/or services management consulting, project assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Systems Operations (Professional Services)* - This is a counterpart to systems operations (processing services) except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.

Turnkey Systems - A turnkey system is an integration of systems and applications software with CPU hardware and peripherals, packaged as a single application (or set of applications) solution. The value added by the vendor is primarily in the software and support. Most CAD/CAM systems and many small-business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems, nor does it include Embedded Computer Resources for military applications. Turnkey systems may be either custom or packaged systems.

- Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

- Turnkey systems revenue is divided into two categories:

  - *Industry-specific systems* - that is, systems that serve a specific function for a given industry sector such as automobile dealer parts inventory, CAD/CAM systems, or discrete manufacturing control systems.

  - *Cross-industry systems* - that is, systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, or personnel management systems.

- Revenue includes hardware, software, and support functions.

Systems Integration: (SI) delivery of large, complex multidisciplinary, multivendor systems, incorporating some or all of these categories: systems design, programming, integration, equipment, packaged software, communication networks, installation education and training, and SI-related professional services and acceptance. Systems integration contracts typically take more than a year to complete and involve a prime contractor assuming risk and accepting full responsibility.

B
Hardware/Hardware Systems

Hardware - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be connected locally to the main processor, and generally cannot be included in other categories such as terminals.

- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters.

- *Communication Devices* - Includes modems, encryption equipment, special interfaces, and error control.

- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

Terminals - Three types of terminals are described below:

- *User-Programmable* - Also called intelligent terminals, including:

    - Single-station or standalone
    - Multistation shared processor
    - Teleprinter
    - Remote batch

- *User Nonprogrammable*

    - Single-station
    - Multistation shared processor
    - Teleprinter

- *Limited Function* - Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

Hardware Systems - Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique

operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in the form of:

  - Integrated circuit package

  - Plug-in boards with more memory and peripheral circuits

  - Console including keyboard and interfacing connectors

  - Personal computer with at least one external storage device directly addressable by the CPU

  - An embedded computer which may take a number of shapes or configurations

  Microcomputers are primarily single-user computers that cost under $15,000.

- *Midsize Computer* - Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer. Specific systems in this category are: IBM 93XX systems, all Digital VAX series systems, and such common UNIX-based systems as from Apollo and Sun) are also included. Most large shared-logic, integrated office systems—such as those from Wang, Hewlett-Packard, and Groupe Bull—would also be considered midsize systems. Does not include microcomputers (standalone, or shared), embedded systems, and CAD/CAM systems.

- *Large Computer* - Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or parallel processors. Intended for structured mathematical and signal processing and typically used with general-purpose, VonNeumann-type processors for system control. Usually refers to traditional mainframes (such as IBM 30XX, Unisys (Sperry) 1100/XX, Honeywell DDPS88, Unisys (Burroughs) A15, or CDC Cyber series) and supercomputers (such as products from Cray, ETA, Fujitsu, and the new IBM development effort).

- *Supercomputer* - High-powered processors with numerical processing throughput that is significantly greater than the fastest general-purpose computers, with capacities in the 100-500 million floating point opera-

tions per second (MFLOPS) range. Newer supercomputers, with burst modes over 500 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class, are labeled Class IV to Class VII in agency long-range plans. Supercomputers fit in one of two categories:

- *Real Time* - Generally used for signal processing in military applications.

- *Non-Real Time* - For scientific use in one of three configurations:

  ° Parallel processors
  ° Pipeline processor
  ° Vector processor

- *Supercomputer* - Term applied to micro, mini, and large mainframe computers with performance substantially higher than attainable by VonNeuman architectures.

• *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semi-permanent interfaces. May vary in capacity from microcomputers to parallel processors computer systems.

C

Telecommunications

Networks - Electronic interconnection between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

• *Common Carrier Network* - A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1200 baud.

• *Value-Added Network (VAN)* - (See listing under Section B, Delivery Modes.)

• *Local Area Network (LAN)* - Limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods:

- *Baseband* - Signaling using digital waveforms on a single frequency band, usually at voice frequencies and bandwidth, and limited to a single sender at any given moment. When used for local-area networks, typically implemented with TDM to permit multiple access.

- *Broadband* - Transmission facilities that use frequencies greater than normal voice-grade, supported in local-area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

  ° Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing)

  ° Multiple (time-sequenced) channels via TDM (Time Division Multiplexing)

  ° High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media)

• *Wide Area Network (WAN)* - Limited access network between computing resources in buildings, complexes of buildings, or buildings within a large metropolitan or wide geographical area. Uses baseband or broadband signaling methods.

Transmission Facilities - Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

• *Mode* - may be either:

  - *Analog* - Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems.

  - *Digital* - Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form.

• *Media* - May be any of the following:

  - *Wire* - Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full-duplex balanced lines.

  - *Carrier* - A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communi-

cations system, used in multiplexing applications to increase network capacity.

- *Coaxial Cable* - A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

- *Microwave* - UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- *Optical Fiber* - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications.

- *Communications Satellites* - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- *Cellular Radio* - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

D

General Definitions

103/113 - Bell standard modem for low-speed transmission up to 300 bps, asynchronous, half or full duplex.

212 - Bell standard for medium-speed transmission at 1200 bps, asynchronous or synchronous, half or full duplex.

ASCII - American National Standards Code for Information Interchange—eight-bit code with seven data bits and one parity bit.

Asynchronous - Communications operation (such as transmission) without continuous timing signals. Synchronization is accomplished by appending signal elements to the data.

Bandwidth - Range of transmission frequencies that can be carried on a communications path; used as a measure of capacity.

Baud - Number of signal events (discrete conditions) per second. Typically used to measure modem or terminal transmission speed.

Benchmark - Method of testing proposed ADP system solutions for a specified set of functions (applications) employing simulated or real data inputs under simulated operating conditions.

BPS - Bits per second - also mbps and kbps, million bits per second and thousand bits per second, respectively.

BSC - IBM's binary synchronous communications data link protocol. First introduced in 1968 for use on point-to-point and multipoint communications channels. Frequently referenced as "bisync."

Byte - Usually equivalent to the storage required for one alphanumeric character (i.e., one letter or number).

CBX - Computerized Branch Exchange - a PABX based on a computer system, implying programmability and usually voice and data capabilities.

Central Processing Unit (CPU) - The arithmetic and control portion of a computer; i.e., the circuits controlling the interpretation and execution of computer instructions.

Centrex - Central office telephone services that permit local circuit switching without installation of customer premises equipment. Could be described as shared PBX service.

Circuit Switching - A process that, usually on demand, connects two or more network stations and permits exclusive circuit use until the connection is released; typical of the voice telephone network where a circuit is established between the caller and the called party.

CO - Central Office - local telco site for one or more exchanges.

CODEC - Coder/decoder, equivalent to modem for digital devices.

Constant Dollars - Growth forecasts in constant dollars make no allowance for inflation or recession. Dollar value based on the year of the forecast unless otherwise indicated.

Computer System - The combination of computing resources required to perform the designed functions and which may include one or more CPUs, machine room peripherals, storage systems, and/or applications software.

CPE - Customer Premises Equipment - DCE or DTE located at a customer site rather than at a carrier site such as the local telephone company CO. May include switchboards, PBX, data terminals, and telephone answering devices.

CSMA/CD - Carrier Sense Multiple Access/Collision Detect. Contention protocol used in local-area networks, typically with a multi-point configuration.

Current Dollars - Estimates or values expressed in current-year dollars which, for forecasts, would include an allowance for inflation.

Data Encryption Standard (DES) - 56-bit key, one-way encryption algorithm adopted by NBS in 1977, implemented through hardware ("S-boxes") or software. Designed by IBM with NSA guidance.

Datagram - A self-contained packet of information with a finite length that does not depend on the contents of preceding or following packets.

DCA - IBM's Document Content Architecture - protocols for specifying document (text) format which are consistent across a variety of hardware and software systems within IBM's DISOSS.

DCE - Data Circuit-Terminating Equipment - interface hardware that couples DTE to a transmission circuit or channel by providing functions to establish, maintain, and terminate a connection, including signal conversion and coding.

DDCMP - Digital Data Communications Message Protocol - data link protocol used in Digital Equipment Company's DECNET.

DECNET - Digital Equipment Company's network architecture.

Dedicated Circuit - A permanently established network connection between two or more stations; contrast with switched circuit.

DEMS - Digital Electronic Message Service - nationwide common carrier digital networks which provide high-speed, end-to-end, two-way transmission of digitally-encoded information using the 10.6 GHz band.

DIA - IBM's Document Interchange Architecture - protocols for transfer of documents (text) between different hardware and software systems within IBM's DISOSS.

DISOSS - IBM's DIStributed Office Support System - office automation environment, based on DCA and DIA, which permits document (text) transfer between different hardware and software systems without requiring subsequent format or content revision.

Distributed Data Processing - The development of programmable intelligence in order to perform a data processing function where it can be accomplished most effectively through computers and terminals arranged in a telecommunications network adapted to the user's characteristics.

DTE - Data Terminal Equipment - hardware which is a data source or link or both, such as video display terminals that convert user information into data for transmission and reconvert data signals into user information.

EBCDIC - Extended Binary Coded Decimal Interchange Code - eight-bit code typically used in IBM mainframe environments.

EFT - Electronic funds transfer.

Encryption - Electrical, code-based conversion of transmitted data to provide security and/or privacy of data between authorized access points.

End User - One who is using a product or service to accomplish his or her own functions. The end user may buy a system from the hardware supplier(s) and do his or her own programming, interfacing, and installation. Alternately, the end user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor.

Engineering Change Notice (ECN) - Product changes to improve the product after it has been released to production.

Engineering Change Order (ECO) - The follow-up to ECNs—they include parts and a bill of materials to effect the change in the hardware.

Equipment Operators - Individuals operating computer control consoles and/or peripheral equipment (BLS definition).

Ethernet - Local area network developed by Xerox PARC using baseband signaling, CSMA/CD protocol, and coaxial cable to achieve a 10 mbps data rate.

Facsimile - Transmission and reception of data in graphic form, usually fixed images of documents, through scanning and conversion of a picture signal.

FDM - Frequency Division Multiplexing - a multiplexing method that permits multiple access by assigning different frequencies of the available bandwidth to different channels.

FEP - Front-End Processor - communications concentrator such as the IBM 3725 or COMTEN 3690 used to interface communications lines to host computers.

Field Engineer (FE) - Field engineer, customer engineer, serviceperson, and maintenance person are used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

Full-Duplex - Bi-directional communications with simultaneous two-way transmission.

General-Purpose Computer System - A computer designed to handle a wide variety of problems. Includes machine room peripherals, systems software, and small business systems.

Half-Duplex - Bi-directional communications, but only in one direction at a time.

Hardware Integrator - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. The hardware integrator also may develop control system software in addition to installing the entire system at the end-user site.

HDLC - High-Level Data Link Control.

Hertz - Number of signal oscillations (cycles) per second - abbreviated Hz.

IBM Token Ring - IBM's local area network using baseband signalling and operating at 4 mbps on twisted-pair copper wire. Actually a combination of star and ring topologies – IEEE 802.5-compatible.

IDN - Integrated Digital Network - digital switching and transmission; part of the evolution to ISDN.

Independent Suppliers - Suppliers of machine room peripherals - usually do not supply general purpose computer systems.

Information Processing - Data processing as a whole, including use of business and scientific computers.

Installed Base - Cumulative number or value (cost when new) of computers in use.

Interconnection - Physical linkage between devices on a network.

Interoperability - The capability to operate with other devices on a network. To be contrasted with interconnection, which merely guarantees a physical network interface.

ISDN - Integrated Services Digital Network - integrated voice and non-voice public network service which is completely digital. Not clearly defined through any existing standards although FCC and other federal agencies are participating in the development of CCITT recommendations.

Keypunch Operators - Individuals operating keypunch machines (similar in operation to electric typewriters) to transcribe data from source materials onto punch cards.

Lease Line - Permanent connection between two network stations. Also known as dedicated or non-switched line.

Machine Repairers - Individuals who install and periodically service computer systems.

Machine Room Peripherals - Peripheral equipment that is generally located close to the central processing unit.

Mainframe - The central processing unit (CPU or units in a parallel processor) of a computer that interprets and executes computer (software) instructions of 32 bits or more. Usually refers to traditional mainframes (such as IBM 30XX, Unisys (Sperry) 1100/XX, Honeywell DDPS88, Unisys (Burroughs) A15, or CDC (Cyber series).

MAP - Manufacturing Automation Protocol - seven-layer communications standard for factory environments promoted by General Motors/EDS. Adopts IEEE 802.2 and IEEE 802.4 standards plus OSI protocols for other layers of the architecture.

Mean Time to Repair - The mean of elapsed times from the arrival of the field engineer on the user's site until the device is repaired and returned to user service.

Mean Time to Respond - The mean of elapsed times from the user call for services and the arrival of the field engineer on the user's site.

Message - A communication intended to be read by a person. The quality of the received document need not be high, only readable. Graphic materials are not included.

MMFS - Manufacturing Messaging Format Standard - application-level protocol included within MAP.

Modem - A device that encodes information into electronically transmittable form (MOdulator) and restores it to original analog form (DEModulator).

NCP - Network Control Program - software used in IBM 3705/3725 FEPs for control of SNA networks.

Node - Connection point of three or more independent transmission points which may provide switching or data collection.

Off-Line - Pertaining to equipment or devices that can function without direct control of the central processing unit.

On-Line - Pertaining to equipment or devices under direct control of the central processing unit.

OSI - ISO reference model for Open Systems Interconnection - seven-layer architecture for application, presentation, session, transport, network, data link, and physical services and equipment.

OSI Application Layer - Layer 7, providing end-user applications services for data processing.

OSI Data Link Layer - Layer 2, providing transmission protocols, including frame management, link flow control, and link initiation/release.

OSI Network Layer - Layer 3, providing call establishment and clearing control through the network nodes.

OSI Physical Layer - Layer 1, providing the mechanical, electrical, functional, and procedural characteristics to establish, maintain, and release physical connections to the network.

OSI Presentation Layer - Layer 6, providing data formats and information such as data translation, data encoding/decoding, and command translation.

OSI Session Layer - Layer 5, establishes, maintains, and terminates logical connections for the transfer of data between processes.

OSI Transport Layer - Layer 4, providing end-to-end terminal control signals such as acknowledgements.

Overseas - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.

PABX - Private Automated Branch Exchange - hardware that provides automatic (electro-mechanical or electronic) local circuit switching on a customer's premises.

PAD - Packet Assembler-Disassembler - a device that enables DTE not equipped for packet switching operation to operate on a packet switched network.

PBX - Private Branch Exchange - hardware which provides local circuit switching on the customer premise.

PCM - Pulse-Code Modulation - modulation involving conversion of a waveform from analog to digital form through coding.

PDN - Public Data Network - a network established and operated by a recognized private operating agency, a telecommunications administration, or other agency for the specific purpose of providing data transmission services to the public.

Peripherals - Any unit of input/output equipment in a computer system, exclusive of the central processing unit.

PPM - Pulse Position Modulation.

Private Network - A network established and operated for one user or user organization.

Programmers - Persons mainly involved in designing, writing, and testing of computer software programs.

Protocols - The rules for communication system operation that must be followed if communication is to be effected. Protocols may govern portions of a network or service. In digital networks, protocols are digitally encoded as instructions to computerized equipment.

Public Network - A network established and operated for more than one user with shared access, usually available on a subscription basis. See related international definition of PDN.

Scientific Computer System - A computer system designed to process structured mathematics, such as Fast Fourier Transforms, and complex, highly redundant information, such as seismic data, sonar data, and radar, with large on-line memories and very high capacity throughput.

SDLC - Synchronous Data Link Control - IBM's data link control for SNA. Supports a subset of HDLC modes.

SDN - Software-Defined Network.

Security - Physical, electrical, and computer (digital) coding procedures to protect the contents of computer files and data transmission from inadvertent or unauthorized disclosure to meet the requirements of the Privacy Act and national classified information regulations.

Service Delivery Point - The location of the physical interface between a network and customer/user equipment.

Simplex - Undirectional communications.

Smart Box - A device for adapting existing DTE to new network standards such as OSI. Includes PADs and protocol convertors, for example.

SNA - Systems Network Architecture-seven-layer communications architecture designed by IBM. Layers correspond roughly but not exactly to OSI model.

Software - Computer programs.

Supplies - Includes materials associated with the use or operations of computer systems, such as printer paper, keypunch cards, disk packs, and tapes.

Switched Circuit - Temporary connection between two network stations established through dial-up procedures.

Synchronous - Communications operation with separate, continuous clocking at both sending and receiving stations.

Systems Analyst - Individual who analyzes problems to be converted to a programmable form for application to computer systems.

Systems House - Vendor that acquires, assembles, and integrates hardware and software into a total system to satisfy the data processing requirements of an end user. The vendor also may develop systems software products for license to end users. The systems house vendor does not manufacture mainframes.

Systems Integrator - Systems house vendor that develops systems interface electronics, applications software, and controllers for the CPU, peripherals, and ancillary subsystems that may have been provided by a contractor or the government (GFE). This vendor may either supervise or perform the installation and testing of the completed system.

TI - Bell System designation for 1.544 mbps carrier capable of handling 24 PCM voice channels.

TDM - Time Division Multiplexing - a multiplexing method that interweaves multiple transmissions on a single circuit by assigning a different time slot to each channel.

Token Passing - Local area network protocol which allows a station to transmit only when it has the "token," an empty slot on the carrier.

TOP - Technical Office Protocol - protocol developed by Boeing Computer Services to support administrative and office operations as complementary functions to factory automation implemented under MAP.

Turnkey System - System composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

Twisted-Pair Cable - Communications cabling consisting of pairs of single-strand metallic electrical conductors, such as copper wires, typically used in building telephone wiring and some LANs.

Verification and Validation - Process for examining and testing applications and special systems software to verify that it operates on the target CPU and performs all of the functions specified by the user.

Voice-Grade - Circuit or signal in the 300-3300 Hz bandwidth typical of the public telephone system - nominally a 4 KHz user.

VTAM - Virtual Telecommunications Access Method - host-resident communications software for SNA networks.

E

Other Considerations

When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures then are categorized according to what the users perceive they are buying.
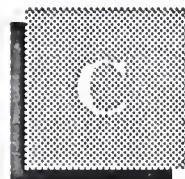
Appendix: Glossary of Acronyms

The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

Federal agency acronyms have been included to the extent they are employed in this report.

A

Federal Acronyms

AAS	Automatic Addressing System.
AATMS	Advanced Air Traffic Management System.
ACO	Administrative Contracting Offices (DCAS).
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program).
ACT-1	Advanced Computer Techniques (Air Force).
Ada	DoD High-Order Language.
ADA	Airborne Data Acquisition.
ADL	Authorized Data List.
ADS	Automatic Digital Switches (DCS).
AFA	Air Force Association.
AFCEA	Armed Forces Communications Electronics Association.
AGE	Aerospace Ground Equipment.
AIP	Array Information Processing.

AIS	Automated Information System.
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
AMSL	Acquisition Management Systems List.
ANG	Army National Guard
AP(P)	Advance Procurement Plan.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement.
ATLAS	Abbreviated Test Language for All Systems (for ATE-Automated Test Equipment).
Authorization	In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
AUSA	Association of the U.S. Army.
AUTODIN	AUTOmatic DIgital Network of the Defense Communications System.
AUTOSEVOCOM	AUTOmatic SEcure VOice COMmunications Network.
AUTOVON	AUTOmatic VOice Network of the Defense Communications System.
BA	Basic Agreement.
BAFO	Best And Final Offer.
Base level	Procurement, purchasing, and contracting at the military installation level.
BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BML	Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanked Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C^2	Command and Control.
C^3	Command, Control, and Communications.
C^4	Command, Control, Communications, and Computers.
C^3I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.
CALS	Computer-Aided Automated Logistic System.
CAPS	Command Automation Procurement Systems.

CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	*Commerce Business Daily* - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCEP	Commercial Comsec Endorsement Program.
CCDR	Contractor Cost Data Reporting.
CCN	Contract Change Notice.
CCPDS	Command Center Processing and Display Systems.
CCPO	Central Civilian Personnel Office.
CCTC	Command and Control Technical Center (JCS).
CDR	Critical Design Review.
CDRL	Contractor Data Requirement List.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act.
CIG	Computerized Interactive Graphics.
CIR	Cost Information Reports.
CM	Configuration Management.
CMI	Computer-Managed Instruction.
CNI	Communications, Navigation, and Identification.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CODSIA	Council of Defense and Space Industry Associations.
COMSTAT	Communications Satellite Corporation.
CONUS	CONtinental United States.
COP	Capability Objective Package.
COTR	Contracting Officer's Technical Representative.
CP	Communications Processor.
CPAF	Cost-Plus-Award-Fee Contract.
CPFF	Cost-Plus-Fixed-Fee Contract.
CPIF	Cost-Plus-Incentive-Fee Contract.
CPR	Cost Performance Reports.
CPSR	Contractor Procurement System Review.
CR	Cost Reimbursement (Cost Plus Contract).
CSA	Combat or Computer Systems Architecture.
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec").
CWAS	Contractor Weighted Average Share in Cost Risk.
DAL	Data Accession List.
DAR	Defense Acquisition Regulations.
DARPA	Defense Advanced Research Projects Agency.
DAS	Data Acquisition System.
DBHS	Data Base Handling System.
DCA	Defense Communications Agency.

DCAA	Defense Contract Audit Agency.
DCAS	Defense Contract Administration Services.
DCASR	DCAS Region.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DCTN	Defense Commercial Telecommunications Network.
DDA	Dynamic Demand Assessment (Delta Modulation).
DDC	Defense Documentation Center.
DDL	Digital Data Link - A segment of a communications network used for data transmission in digital form.
DDN	Defense Data Network.
DDS	Dynamic Diagnostics System.
DECCO	DEfense Commercial Communications Office.
DECEO	DEfense Communications Engineering Office.
D&F	Determination and Findings - required documentation for approval of a negotiated procurement.
DIA	Defense Intelligence Agency.
DIF	Document Interchange Format, Navy-sponsored word processing standard.
DHHS	Department of Health and Human Services.
DIDS	Defense Integrated Data Systems.
DISC	Defense Industrial Supply Center.
DLA	Defense Logistics Agency.
DMA	Defense Mapping Agency.
DNA	Defense Nuclear Agency.
DO	Delivery Order.
DOA	Department of Agriculture (also USDA).
DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).
DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report.
DSCS	Defense Satellite Communication System.
DSN	Defense Switched Network.
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.

EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAC	Facility Contract.
FAR	Federal Acquisition Regulations.
FCA	Functional Configuration Audit.
FCC	Federal Communications Commission.
FCDC	Federal Contract Data Center.
FCRC	Federal Contract Research Center.
FDPC	Federal Data Processing Center.
FEDSIM	Federal (Computer) Simulation Center (GSA).
FEMA	Federal Emergency Management Agency.
FFP	Firm Fixed-Price Contract (also Lump Sum Contract).
FIPS	NBS Federal Information Processing Standard.
FIPS PUBS	FIPS Publications.
FIRMR	Federal Information Resource Management Regulations.
FMS	Foreign Military Sales.
FOC	Final Operating Capability.
FOIA	Freedom of Information Act.
FP	Fixed-Price Contract.
FP-L/H	Fixed-Price - Labor/Hour Contract.
FP-LOE	Fixed-Price - Level-Of-Effort Contract.
FPMR	Federal Property Management Regulations.
FPR	Federal Procurement Regulations.
FSC	Federal Supply Classification.
FSG	Federal Supply Group.
FSN	Federal Supply Number.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
FSTS	Federal Secure Telecommunications System.
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
FTS	Federal Telecommunications System.
FTS 2000	Proposed replacement for the Federal Telecommunications System.
FY	Fiscal Year.
FYDP	Five-Year Defense Plan.
GAO	General Accounting Office.
GFE	Government-Furnished Equipment.

GFM	Government-Furnished Material.
GFY	Government Fiscal Year (October to September).
GIDEP	Government-Industry Data Exchange Program.
GOCO	Government Owned - Contractor Operated.
GOGO	Government Owned - Government Operated.
GOSIP	Government Open Systems Interconnection Profile.
GPO	Government Printing Office.
GPS	Global Positioning System.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control.
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HPA	Head of Procuring Activity.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
ICA	Independent Cost Analysis.
ICAM	Integrated Computer-Aided Manufacturing.
ICE	Independent Cost Estimate.
ICP	Inventory Control Point.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.
IDEP	Interservice Data Exchange Program.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IOI	Internal Operating Instructions.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resources Management.
IXS	Information Exchange System.
JFMIP	Joint Financial Management Improvement Program.
JOCIT	Jovial Compiler Implementation Tool.
JSIPS	Joint Systems Integration Planning Staff.
JSOP	Joint Strategic Objectives Plan.
JSOR	Joint Service Operational Requirement.
JUMPS	Joint Uniform Military Pay System.
LC	Letter Contract.
LCC	Life Cycle Costing.
LCMP	Life Cycle Management Procedures (DD7920.1).

LCMS	Life Cycle Management System.
L-H	Labor-Hour Contract.
LOI	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.
MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MDA	Multiplexed Data Accumulator.
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCMA	National Contract Management Association.
NCS	National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
NTIS	National Technical Information Service.
Obligation	"Earmarking" of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.
OFMP	Office of Federal Management Policy (GSA).

OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Readiness.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSHA	Occupational Safety and Health Act.
OSI	Open System Interconnect.
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
P3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.
PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POM	Program Objective Memorandum.
POSIX	Portable Open System Interconnection Exchange.
POTS	Purchase of Telephone Systems.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
PS	Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-I	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.

R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).
SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
SNAP	Shipboard Nontactical ADP Program.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program - Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief Description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.

TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.
TILO	Technical and Industrial Liason Office—Qualified Requirement Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.
USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Affairs Department.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

B

General and Industry Acronyms

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association.
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	Bell Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultaif Internationale de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
COBOL	COmmon Business-Oriented Language.
COS	Corporation for Open Systems.
CPU	Central Processing Unit.
DBMS	Data Base Management System.
DRAM	Dynamic Random Access Memory.
EIA	Electronic Industries Association.
EPROM	Erasible Programmable Read-Only-Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.
MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value-Added Retailer.
VLSI	Very Large Scale Integration.
WORM	Write-Once-Read-Many-Times.

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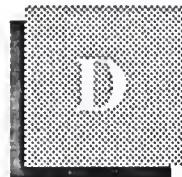
Appendix: Policies, Regulations, and Standards

A

OMB Circulars		
	A-11	Preparation and Submission of Budget Estimates.
	A-49	Use of Management and Operating Contracts.
	A-71	Responsibilities for the Administration and Management of Automatic Data Processing Activities.
	A-76	Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government.
	A-109	Major Systems Acquisitions.
	A-120	Guidelines for the Use of Consulting Services.
	A-121	Cost Accounting, Cost Recovery, and Integrated Sharing of DataProcessing Facilities.
	A-123	Internal Control Systems.
	A-127	Financial Management Systems.
	A-130	Management of Federal Information Resources.
	A-131	Value Engineering.

B

GSA Publications

The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition, and use of both ADP and telecommunications information resources.

C

DoD Directives		
	DD-5000.1	Major System Acquisitions.
	DD-5000.2	Major System Acquisition Process.
	DD-5000.11	DoD Data Elements and Data Codes Standardization Program.
	DD-5000.31	Interim List of DoD-Approved High-Order Languages.
	DD-5000.35	Defense Acquisition Regulatory Systems.
	DD-5200.1	DoD Information Security Program.
	DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems.

	DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
	DD-7920.1	Life Cycle Management of Automated Information (AIS).
	DD-7920.2	Major Automated Information Systems Approval Process.
	DD-7935	Automated Data Systems (ADS) Documentation.

D

Standards	ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NBS FIPS 71.
	CCITT G.711	International PCM standard.
	CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.
	DEA-1	Proposed ISO standard for data encryption based on the NBS DES.
	EIA RS-170	Monochrome video standard.
	EIA RS-170A	Color video standard.
	EIA RS-464	EIA PBX standards.
	EIA RS-465	Standard for Group III facsimile.
	EIA RS-466	Facsimile standard; procedures for document transmission in the General Switched Telephone Network.
	EIA RS-232-C	EIA DCE to DTE interface standard using a 25-Pin connector; similar to CCITT V-24.
	EIA RS-449	New EIA standard DTE to DCE interface which replaces RS-232-C.
	FED-STD 1000	Proposed Federal Standard for adoption of the full OSI reference model.
	FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.
	FED-STD 1041	Equivalent to FIPS 100.
	FED-STD 1061	Group II Facsimile Standard (1981).
	FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465.
	FED-STD 1063	Federal facsimile standard; equivalent to EIA RS-466.
	FED- STDs 1005, 1005A-1008	Federal Standards for DCE Coding and Modulation.
	FIPS 46	NBS Data Encryption Standard (DES).
	FIPS 81	DES Modes of Operation.
	FIPS 100	NBS Standard for packet-switched networks; subset of 1980 CCITT X.25.
	FIPS 107	NBS Standard for local area networks, similar to IEEE 802.2 and 802.3.

FIPS 146	Government Open Systems Interconnection (OSI) Profile (GOSIP).
FIPS 151	NIST POSIX (Portable Operating System Interface for UNIX) standard.
IEEE 802.2	OSI-Compatible IEEE standard for data-link control in local area networks.
IEEE 802.3	Local area network standard similar to Ethernet.
IEEE 802.4	OSI-compatible standard for token-bus local area networks.
IEEE 802.5	Local area networks standard for token-ring networks.
IEEE P1003.1	POSIX standard, similar to FIPS 151.

MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
MIL-STD-1777	IP-Internet Protocol.
MIL-STD-1778	TCP - Transmission Control Protocol.
MIL-STD-1780	File Transfer Protocol.
MIL-STD-1781	Simple Mail Transfer Protocol (electronic mail).
MIL-STD-1782	TELNET - virtual terminal protocol.
MIL-STD-1815A	Ada Programming Language Standard.
SVID	UNIX System Interface Definition.
X.12	ANSI standard for Electronic Data Interchange.
X.21	CCITT Standard for interface between DTE and DCE for synchronous operation on public data networks.
X.25	CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks.
X.75	CCITT standard for links that interface different packet networks.
X.400	ISO Application-level standard for the electronic transfer of messages (electronic mail).

D-4
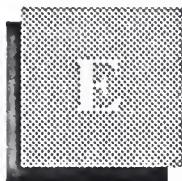
Appendix: Related INPUT Reports

A

Annual Market Analyses

U.S. Information Services Vertical Markets, 1989

U.S. Information Services Cross-Industry Markets, 1988

Procurement Analysis Reports, GFY 1990-1995

B

Industry Surveys

U.S. Information Services Industry, 1988

Eighteenth Annual ADAPSO Survey of the Computer Services Industry

Directory of Leading U.S. Information Services Vendors, 1988

C

Market Reports

- *Federal Large-Scale Systems Market, 1988-1993*
- *Federal Professional Services Market, 1989-1994*
- *Federal Software and Related Services Market, 1989-1994*
- *Federal Midsize Systems Market, 1988-1993*
- *Federal Systems Integration Market, 1989-1994*
- *Federal Telecommunications Market, 1988-1993*
- *Federal Office Information Systems Market, 1988-1993*
- *Federal Microcomputer Market, 1989-1994*
- *Defense Logistics Agency Information Services Market*
- *NASA Information Systems Market, 1988-1993*
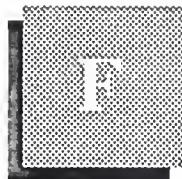
Appendix: Federal Agency Questionnaire

Confidential

INPUT Questionnaire - Federal Agencies   Catalog No. FISSP-66

Study Title: *Federal Processing Services/Systems Operations Market*   *Code: G-PFM*
(1989-1994)

Interview Type: ❑ Buyer   ❑ Telephone   Date:_____
                        ❑ User   ❑ On-Site
                        ❑ Policy   ❑ Mail

Interviewer:_____

This questionnaire is directed to the study of the federal government's plans for the use of processing services and systems operations (FM) services. The study focuses on the applications, regulations, and relevant issues for this market.

Respondent Name:_____

Title: _____ Phone: _____

Department:_____

Agency:_____

Address:_____

_____

_____

Office Code:_____

Function:_____

Referrals:_____

_____

Thank you for your patience in completing this questionnaire. Please return this questionnaire by_____ in the enclosed envelope. You will receive an executive summary of this report.

Federal Processing Services/Systems Operations Market

Questionnaire Definitions

For the purposes of this survey, INPUT defines Processing Services, "ADP Facilities Management," "On-Site ADP Operation and Maintenance," and other related services as follows:

Processing Services - Processing of computer-based applications using vendors' computers.

Remote Computing Services (RCS) - Provision of data processing to a user by means of terminals at the user's site(s). Terminals are connected by a data communications network to the vendor's central computer. The most frequent contract vehicle for RCS in the federal government is GSA's Teleprocessing Services Program (TSP). RCS includes the following submodes:

* *Interactive (timesharing)* - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing but also for data entry and transaction processing; the user is on-line to the program/files.

* *Remote Batch* - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements.

* *Proprietary Data Base* - Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor, owned by a third party, or licensed by the federal agency.

Distributed Processing Services - Alternately called "Distributed Data Processing" (DDP); can provide access through the network to the RCS vendor's larger computer. Includes local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.

Processing Facilities Management (PFM) (also referred to as "Resource Management," "Systems Operations," or COCO— Contractor-Owned/Contractor-Operated) - The management of all or part of a user's data processing functions under a long-term contract (not less than one year). This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

Value-Added Networks (also known as VANs) - Communications networks in which the services purchased from common carriers are enhanced by the provision of additional services. These services extend the "value" of the network beyond the traditional transmission and switching capabilities provided. Examples of value-added network services are packet switching, terminal interfaces, formatting of messages, conversion of codes, and handling of error detection and correction.

Local-Area Networks (LANs) - Limited-access networks between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings within a metropolitan area. Uses either baseband or broadband signaling methods.

Professional Services Facilities Management (PSFM) (also referred to as GOCO—Government-Owned/Contractor-Operated) - The counterpart to processing facilities management, except that the computers are owned or leased by the government, not the PSFM vendor, and the vendor provides the staff to operate, maintain, and manage the government's facility.

Operation and Maintenance (also referred to as O&M) - Contractor (vendor)-staffed support of client ADP/telecommunications equipment on-site (on government property), in cases where the vendor does not manage the complete facility and the equipment and initial software suite may not have been provided by the vendor. Contractor may also be responsible for software development and/or modification of existing software.

Systems Operations - The combination of both processing facilities management (PFM) and professional services facilities management (PSFM) as defined earlier.

Confidential

Federal Agency Questionnaire
Federal Processing Services/Systems Operations Market

1a. Is your agency/organization currently using any of the following processing services or systems operations services? Will you be using them in the future? (Check all that apply in each column)

	Currently Yes	Currently No	Future Yes	Future No
Remote Computing Services (timesharing)	❑	❑	❑	❑
Batch Processing	❑	❑	❑	❑
Distributed Processing Services	❑	❑	❑	❑
Value-Added Networks (VANs)	❑	❑	❑	❑
Local Area Networks (LANs)	❑	❑	❑	❑
Processing Facilities Mgmt. (COCO)	❑	❑	❑	❑
Professional Services Facilities Mgmt. (GOCO)	❑	❑	❑	❑
Professional/Technical ADP On-Site Operation and Maintenance Services	❑	❑	❑	❑

1b. For processing services, please indicate percentage of interactive versus batch.
____% batch   ____% interactive

2. In which of the following categories do you expect either an increase or a decrease in agency acquisition of services in the next two to five years, and can you estimate by what percent?

	Increase	Decrease	No Change	Percent Change
Remote Computing Services	❑	❑	❑	_____
Value-Added Networks	❑	❑	❑	_____
PFM-COCO	❑	❑	❑	_____
PSFM-GOCO	❑	❑	❑	_____
On-Site ADP & O&M	❑	❑	❑	_____
Other (_____)	❑	❑	❑	_____

3. What three main factors have contributed to the expected increase or decrease?

(1)_____

(2)_____

(3)_____

4. How much is budgeted in yearly expenditures for:

Budget Range	Processing Services	Systems Operations
$250,000 and under	❑	❑
$251,000 - $499,999	❑	❑
$500,000 - $999,999	❑	❑
$1,000,000 - $4,999,999	❑	❑
Over $5,000,000	❑	❑

5. Amount is allocated for:

Total agency/department	❑	❑
Specific organization within agency/ department? (_____)	❑	❑

6.   What types of applications are you currently running on your organization's processing services systems and systems operations programs? Future Applications? **(Check all that apply in each column)**

Applications	Processing Services		Systems Operations	
	Current	Future	Current	Future
Personnel/Payroll/Recruiting	❑	❑	❑	❑
Mission Support	❑	❑	❑	❑
Administrative	❑	❑	❑	❑
Data Base - Agency Data	❑	❑	❑	❑
Data Base - Proprietary	❑	❑	❑	❑
Inventory/Tracking	❑	❑	❑	❑
Financial/Accounting	❑	❑	❑	❑
Project Management	❑	❑	❑	❑
Logistics/Simulation	❑	❑	❑	❑
Text Processing	❑	❑	❑	❑
Econometrics/Planning Models	❑	❑	❑	❑
Engineering Processing	❑	❑	❑	❑
Scientific/Statistical	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑

7a.   Does your agency currently use or plan to use Local-Area Networks (LANs) for any of its information processing applications?

Currently ❑   Plan to use ❑   No ❑

7b.   To what extent have LANs replaced the acquisition of processing services from outside sources?

_____

_____

_____

7c.   For what applications?

_____

_____

_____

8a.   In the past, has your office moved any applications from Remote Computer Services (RCS) to other forms of data processing?

❑ Yes   ❑ No

8b.   If yes: What applications?_____

9.   What were the two most important reasons for switching the application(s) from RCS to other computing services?

1. _____

2. _____

10. Do you anticipate moving any applications off RCS in the future?
❑ Yes   ❑ No

Why?_____

11. Has your agency/organization increased or decreased its use of Federal Data Processing Centers?

___Increased because_____

_____

___Decreased because_____

_____

___Remained same because_____

_____

12a. When a commercial services contract for Systems Operations or On-Site O&M is completed, do you usually transfer continued support in-house or leave support with contractors:
❑ In-house   ❑ Contractors

12b. Do you plan to convert any Systems Operations or On-Site O&M Services contracts to in-house?
❑ Yes   ❑ No

Why?_____

Which applications? _____

_____

13. Do you plan to convert any in-house ADP O&M support functions to outside contractor support?
❑ Yes   ❑ No

Why?_____

Which applications? _____

_____

14. In your opinion, what level of satisfaction, on a scale of 1 to 5, has your agency experienced with vendor processing services or systems operations in the past regarding: (1=Lowest, 5=Highest)

Criteria	Rating				
Quality of work	1	2	3	4	5
Quantity of work	1	2	3	4	5
Responsiveness	1	2	3	4	5
Project management	1	2	3	4	5
Development visibility	1	2	3	4	5
Delivery schedule(s)	1	2	3	4	5
Cost	1	2	3	4	5

15. How might processing and systems operations services become more valuable to your agency? **(List suggestions for improvement)**

_____

_____

_____

16. Please rank, on a 1-5 basis, the following vendor selection criteria from an agency viewpoint. **(1=Highest, 5=Lowest Rank)**

Selection Criteria	Rank
Contract Type	_____
Cost Control Procedures	_____
Initial Cost	_____
Proposed Operating Procedures	_____
Vendor Reputation	_____

17. What methods of government procurement does your agency use for acquiring processing services and systems operations?

	Processing Services	Systems Operations
GSA schedules	❑	❑
RFPs for specific purchases	❑	❑
Mission oriented contracts	❑	❑
Acquire as part of other procurements	❑	❑
Other methods _____	❑	❑

18. What type of contract does your agency prefer for each type of commercial services category you use:

	Cost-Plus	Fixed-Price	Fixed-Labor	Price-Hour	Mix	Other
Remote Computer Services	❑	❑	❑	❑	❑	❑
Value-Added Networks	❑	❑	❑	❑	❑	❑
PFM-COCO	❑	❑	❑	❑	❑	❑
PSFM-GOCO	❑	❑	❑	❑	❑	❑
On-Site O&M without software development responsibility	❑	❑	❑	❑	❑	❑
On-Site O&M with software development responsibility	❑	❑	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑	❑	❑

19a. Have you had any experience procuring RCS service under the Teleprocessing Services Program (TSP)?
❑ Yes   ❑ No

19b. Which of the following TSP methods have you used to acquire commercial remote computing services?
❑ MASC   ❑ BA

19c.   In your opinion, how could the MASC or BA be improved?

_____

_____

_____

20.   Which reason(s) best describe your agency's/organization's purchase of processing services outside of the TSP program? **(Check all that apply)**
❑ Exempt from mandatory TSP use
❑ Use other governmental computer facilities
❑ Have special applications
❑ Use proprietary data bases
❑ Other (_____)
❑ Unknown

21.   Please rate the relative importance of each vendor characteristic for contract award. On a scale of 1-5, with 5 being very important, how important is:

Characteristic		Rating			
Agency experience of vendor	1	2	3	4	5
Application functional experience	1	2	3	4	5
Computer reliability	1	2	3	4	5
Documentation	1	2	3	4	5
Federal contract experience	1	2	3	4	5
Hardware experience	1	2	3	4	5
Incumbent contractor	1	2	3	4	5
Price	1	2	3	4	5
Software development experience	1	2	3	4	5
Staff experience	1	2	3	4	5
Support capabilities	1	2	3	4	5
Training capabilities	1	2	3	4	5

22.   In your opinion, what are the differences or similarities between the two types of services (**Processing Services and Systems Operations**)?

Differences	**Similarities**
_____	_____
_____	_____
_____	_____
_____	_____

23a. For what reasons would a government agency use one type of service instead of the other?

a) Processing Services: _____

_____

b) Systems Operations: _____

_____

23b. Has your agency changed from using one type of service to the other?
❏ Yes   ❏ No

Why?_____

24. In your opinion, what specific advantages and disadvantages do federal agencies face in their use of processing services and systems operations?

	Processing Services	**Systems Operations**
Advantages	_____	_____
	_____	_____
	_____	_____
Disadvantages	_____	_____
	_____	_____
	_____	_____

25a. What has been the impact of OMB A-76 on your agency's contracting for processing services and systems operations?

_____

_____

_____

What applications have been impacted by OMB A-76 studies?

_____

_____

25b. What percent of your agency's/organization's COCO and GOCO service contracts have been implemented following an OMB A-76 review?

_____% (estimate)

26a.   In your opinion, who are some of the leading vendors in the federal processing services market? (Specify vendor
        names)

_____

_____

26b.   In your opinion, who are some of the leading vendors in the systems operations market? (Specify vendor names)

_____

_____

27.   How will the following trends and developments affect, if at all, the federal market for processing services and
        systems operations?

        a) Growth in End User Computing_____

_____

        b) Industry Consolidation_____

_____

        c) Federal Budget Constraints_____

_____

        d) FTS 2000_____

_____

        e) Heightened Computer Security Requirements_____

_____

        f) Any Other Developments_____

_____
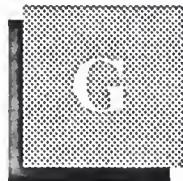
Appendix: Industry Vendor Questionnaire

Confidential

INPUT Questionnaire—Industry Vendors   Catalog No. FISSP-67

Study Title: *Federal Processing Services/Systems Operations Market*   Code: GPFM
(1989-1994)

Type of Interview: ❑ Marketing   ❑ Telephone   Date:_____
                      ❑ Technical   ❑ On-Site
                      ❑ Executive   ❑ Mail

This questionnaire is directed to the study of the federal government's plans for the use of operational support (FM) services. The study focuses on the applications, regulations, and relevant issues for this market.

Interviewer: _____

Respondent Name: _____
Title: _____   Phone: _____

Company:_____

Address:_____

_____

_____

Office Code:_____

Note: Would your company be available to provide a case study example of a recent installation of an operational support system?

❑ Yes   ❑ No

If so, Agency Program Title:_____

Company Point of Contact (Name):_____

(Phone):_____

Thank you for your patience in completing this questionnaire. Please return this questionnaire by_____ in the enclosed envelope. You will receive an executive summary of this report.

Federal Processing Services/Systems Operations Market

Questionnaire Definitions

For the purposes of this survey, INPUT defines Processing Services, "ADP Facilities Management," "On-Site ADP Operation and Maintenance," and other related services as follows:

Processing Services - Processing of computer-based applications using vendors' computers.

Remote Computing Services (RCS) - Provision of data processing to a user by means of terminals at the user's site(s). Terminals are connected by a data communications network to the vendor's central computer. The most frequent contract vehicle for RCS in the federal government is GSA's Teleprocessing Services Program (TSP). RCS includes the following submodes:

- *Interactive (timesharing)* - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing but also for data entry and transaction processing; the user is on-line to the program/files.

- *Remote Batch* - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements.

- *Proprietary Data Base* - Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor, owned by a third party, or licensed by the federal agency.

Distributed Processing Services - Alternately called "Distributed Data Processing" (DDP); can provide access through the network to the RCS vendor's larger computer. Includes local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.

Processing Facilities Management (PFM) (also referred to as "Resource Management," "Systems Operations," or "COCO"—contractor-owned/contractor-operated) - The management of all or part of a user's data processing functions under a long-term contract (not less than one year). This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

Value-Added Networks (also known as VANs) - Communications networks in which the services purchased from common carriers are enhanced by the provision of additional services. These services extend the "value" of the network beyond the traditional transmission and switching capabilities provided. Examples of value-added network services are packet switching, terminal interfaces, formatting of messages, conversion of codes, and handling of error detection and correction.

Local-Area Networks (LANs) - Limited-access networks between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings within a metropolitan area. Uses either baseband or broadband signaling methods.

Professional Services Facilities Management (PSFM) (also referred to as GOCO—Government-Owned/Contractor-Operated) - The counterpart to processing facilities management, except that the computers are owned or leased by the government, not the PSFM vendor, and the vendor provides the staff to operate, maintain, and manage the government's facility.

Operation and Maintenance (also referred to as O&M) - Contractor (vendor)-staffed support of client ADP/telecommunications equipment on-site (on government property), in cases where the vendor does not manage the complete facility and the equipment and initial software suite may not have been provided by the vendor. Contractor may also be responsible for software development and/or modification of existing software.

Systems Operations - The combination of both processing facilities management (PFM) and professional services facilities management (PSFM) as defined earlier.

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Industry Questionnaire—Processing Services/Systems Operations Market

1. What types of products and services do you provide or plan to provide to the federal government? (Check all **current and future services that apply**)

	Current Yes	Current No	Future Yes	Future No
Remote Computing Services (timesharing)	❏	❏	❏	❏
Batch Processing	❏	❏	❏	❏
Distributed Processing Services	❏	❏	❏	❏
Value-Added Networks (VANs)	❏	❏	❏	❏
Local Area Networks (LANs)	❏	❏	❏	❏
Processing Facilities Mgmt. (COCO)	❏	❏	❏	❏
Professional Services Facilities Mgmt. (GOCO)	❏	❏	❏	❏
Professional/Technical ADP On-Site Operation and Maintenance Services	❏	❏	❏	❏

2. In your opinion, which federal agencies present the best marketing opportunities for the products and services your company provides?

    DoD, including:_____

    Why?_____

    Civil agencies, including:_____

    Why?_____

3. Which of the following reasons have influenced your company's decision to compete in the federal processing services and/or systems operations market for products and services? (Check all that apply)

Growth potential	❏	New technology	❏
Past experience	❏	Profit potential	❏
Possession of diversity of required skills	❏	Software skills	❏
Long-term involvement	❏	Defense prospects	❏

    Other (**Specify**)_____

4. In which of the following categories do you expect either an increase or a decrease in agency acquisition of services in the next two to five years, and can you estimate by what percent?

	Increase	Decrease	No Change	Percent Change
Remote Computing Services	❏	❏	❏	_____
Value-Added Networks	❏	❏	❏	_____
PFM-COCO	❏	❏	❏	_____
PSFM-GOCO	❏	❏	❏	_____
On-Site ADP & O&M	❏	❏	❏	_____
Other (_____)	❏	❏	❏	_____

5. What three main factors have contributed to the expected increase or decrease?

(1)_____

(2)_____ GPFM

(3)_____

6. What types of applications are federal agencies currently running on your organization's processing services systems and systems operations programs? Future Applications? **(Check all that apply in each column)**

Applications	Processing Services		Systems Operations	
	Current	Future	Current	Future
Personnel/Payroll/Recruiting	❑	❑	❑	❑
Mission Support	❑	❑	❑	❑
Administrative	❑	❑	❑	❑
Data Base - Agency Data	❑	❑	❑	❑
Data Base - Proprietary	❑	❑	❑	❑
Inventory/Tracking	❑	❑	❑	❑
Financial/Accounting	❑	❑	❑	❑
Project Management	❑	❑	❑	❑
Logistics/Simulation	❑	❑	❑	❑
Text Processing	❑	❑	❑	❑
Econometrics/Planning Models	❑	❑	❑	❑
Engineering Processing	❑	❑	❑	❑
Scientific/Statistical	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑

7. Which applications, in order of importance, have suffered the greatest loss in the past year to alternate forms of data processing?

(1) _____

(2) _____

(3) _____

8. What applications do you feel are most vulnerable to replacement by alternate forms of data processing over the next year? The next 2-5 years?

Next 12 Months	**Next 2-5 Years**
_____	_____
_____	_____
_____	_____

9.   To what extent have LANs replaced the acquisition of processing services from outside sources?

_____

_____

_____

9b.   For what applications?

_____

_____

10.   What factors determine if a government agency would use either processing services or systems operations services?

Processing Services	**Systems Operations**
_____	_____
_____	_____
_____	_____

11.   In your opinion, what level of satisfaction, on a scale of 1 to 5, have federal agencies experienced with vendor processing services or systems operations in the past regarding: (1=Lowest, 5=Highest)

Criteria			Rating		
Quality of work	1	2	3	4	5
Quantity of work	1	2	3	4	5
Responsiveness	1	2	3	4	5
Project management	1	2	3	4	5
Development visibility	1	2	3	4	5
Delivery schedule(s)	1	2	3	4	5
Cost	1	2	3	4	5

12.   How might processing and systems operations services become more valuable to the federal government? (List **suggestions for improvement**)

_____

_____

_____

13. Please rank, on a 1-5 basis, the following vendor selection criteria from an agency viewpoint. **(1=Highest, 5=Lowest Rank)**

Selection Criteria	Rank
Contract Type	____
Cost Control Procedures	____
Initial Cost	____
Proposed Operating Procedures	____
Vendor Reputation	____

14. What methods of government procurement has your company used for providing processing services and systems operations?

	Processing Services	Systems Operations
GSA schedules	❏	❏
RFPs for specific purchases	❏	❏
Mission-oriented contracts	❏	❏
Supply as part of other procurements	❏	❏
Other methods _____	❏	❏

15. Please rate the relative importance of each vendor characteristic for contract award. On a scale of 1-5, with 5 being very important, how important is:

Characteristic	Rating				
Agency experience with vendor	1	2	3	4	5
Application functional experience	1	2	3	4	5
Computer reliability	1	2	3	4	5
Documentation	1	2	3	4	5
Federal contract experience	1	2	3	4	5
Hardware experience	1	2	3	4	5
Incumbent contractor	1	2	3	4	5
Price	1	2	3	4	5
Software development experience	1	2	3	4	5
Staff experience	1	2	3	4	5
Support capabilities	1	2	3	4	5
Training capabilities	1	2	3	4	5

16. What type of contract does your company prefer for each type of commercial services category you provide?

	Cost-Plus	Fixed-Price	Fixed-Labor	Price-Hour	Mix	Other
Remote Computer Services	❏	❏	❏	❏	❏	❏
Value-Added Networks	❏	❏	❏	❏	❏	❏
PFM-COCO	❏	❏	❏	❏	❏	❏
PSFM-GOCO	❏	❏	❏	❏	❏	❏
On-Site O&M without software development responsibility	❏	❏	❏	❏	❏	❏
On-Site O&M with software development responsibility	❏	❏	❏	❏	❏	❏
Other (_____)	❏	❏	❏	❏	❏	❏

17a. Have you had any experience providing remote computer services under the Teleprocessing Services Program (TSP)?
      ❑ Yes   ❑ No

17b. Which of the following TSP methods was used to provide commercial remote computing services?
      ❑ MASC   ❑ BA

17c. In your opinion, how could the MASC or BA be improved?

      _____

      _____

      _____

18.   In your opinion, what specific advantages and disadvantages do federal vendors face in providing processing services and systems operations to agencies?

                          Processing Services   **Systems Operations**

      Advantages   _____   _____

                      _____   _____

                      _____   _____

      Disadvantages   _____   _____

                      _____   _____

                      _____   _____

19.   What has been the impact of OMB A-76 on the federal government's contracting for processing services and systems operations?

      _____

      _____

      _____

20.   Please estimate what percent of the federal government's COCO and GOCO service contracts have been implemented following an OMB A-76 review.

      _____% (estimated)

21a. In your opinion, who are some of the leading vendors in the federal processing services market? (Specify vendor **names**)

      _____

      _____

21b. In your opinion, who are some of the leading vendors in the systems operations market? (**Specify vendor names**)

_____

_____

22a. How have your company's teaming efforts in the processing services/systems operations market changed over the past 2 years?

Increased ❑   No change ❑

Decreased ❑   No teaming experience ❑

22b. Based on either your company's current or past contract experience, how would you rate the overall success level of your teaming relationship with other hardware, software, and professional services vendors?
Rate your success level using a 1-5 scale, where 5 means extremely successful, and 1 means not successful at all.

(**Circle response**) 1   2   3   4   5

No response/no teaming experience_____

23. Which type(s) of vendor do you usually team with in your federal processing services or systems operations contracts? (**Check all that apply**)

Vendor Type

❑   Hardware Vendor
❑   Systems Integrator
❑   Professional Services Firm
❑   Software Manufacturer
❑   Communications Firm
❑   Aerospace Division
❑   Not-for-Profit Firm
❑   Small Businesses/8(a) Firm
❑   Other (_____)
❑   No Teaming

24. How might the teaming relationship(s) have been improved (i.e., impact of teaming with other types of vendors, etc.)?

Processing Services   **Systems Operations**

_____   _____

_____   _____

_____   _____

25.   How will the following trends and developments affect, if at all, the federal market for processing services and systems operations?

a) Growth in End-User Computing_____

_____

b) Industry Consolidation_____

_____

c) Federal Budget Constraints_____

_____

d) FTS 2000_____

_____

e) Heightened Computer Security Requirements_____

_____

f) Any Other Developments_____

_____

26.   What percent of your company's revenue was derived from processing services last year?_____%

Operational support?_____%

27.   What percentage of your processing services business was done with the federal government last year?
_____%

Operational support?_____%

28.   What percent of your company's federal processing services revenues are derived from the following services?

Interactive	_____%
Batch	_____%
Processing FM (COCO)	_____%
Distributed Data Processing	_____%
Value-Added Networks	_____%
Professional Services FM (GOCO)	_____%
On-Site ADP & O&M	_____%
Other (_____)	_____%